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A REVISION OF THE MALAYAN SPECIES OF THE *NACADUBA* GROUP OF GENERA (LEPIDOPTERA: LYCAENIDAE)

By A. STEVEN CORBET, D.Sc., Ph.D.

WITH ONE PLATE AND TWENTY-SIX FIGURES.

(Read 2nd February, 1938.)

THE *Nacaduba* group of genera occurs throughout the Indo-Australian region and constitutes a fairly homogeneous division. Fruhstorfer (1916, *Zool. Meded.*, 2: 103-140) first attempted the collation of all the *Nacaduba* forms, and the monograph of the genus by Seitz (1923, *Grossschmett. Erde*, 9: 913-923) is based on Fruhstorfer's work. Papers by Toxopeus (1927, *Treubia*, 9: 423-436 and 1929, *Tijd. Ent.*, 72: 215-244) have clarified considerably the position regarding the species of the *N. berenice* group and the Javanese *Nacaduba* species in general. The key to the Indian species of the genus by Evans (1932, *Ident. Indian Butt.*: 239-244) has formed the classificatory basis of the present revision of the Malayan forms. Most of the Javanese species are accurately figured in Piepers and Snellen, 1909-1918, *Rhopalocera of Java*.

Many doubtful points have been elucidated by a study of the Fruhstorfer types at the British Museum.

An investigation of the male genitalia of the *Nacaduba* species has given results in accord with those of Fruhstorfer, Toxopeus and Ormiston (1924, *Butt. Ceylon*, pl. vii). It is evident, however, that Fruhstorfer's figure of the male genitalia of *N. glauca* (1916, *loc. cit.*, pl. iv, f. 8) refers to a species of the *N. nora* group, while his figure purporting to be *N. isana* (pl. v, f. 6) is, in fact, a *N. nabo* form. I have been unable to place Ormiston's figure of the "wet-season form" of *N. nabo* (pl. vii, f. 3).

In this paper are figured the claspers of all the Malaysian species in which an examination of the male genitalia is an aid to determination. With rubbed specimens of the *N. pavana* and *N. berenice* groups a scrutiny of the male genitalia is often essential to ensure correct identification.

The geographical differences shown by the Malaysian species of *Nacaduba* are similar to those found with the *Celastrina* species (Corbet, 1937, *Trans. R. ent. Soc. Lond.*, 86: 19-34). The Javanese representatives are the lightest, with the most restricted black markings on the upperside, while the Malayan and Bornean forms are the darkest. The Javanese forms are often distinctive in having the distal half of the underside of each wing strongly whitened, as in many Ceylon races. These differences between the various Malaysian forms of the *Nacaduba* species, however, are much less than in the montane genus *Celastrina*, and with some species they are too slight to admit of subspecific separation. The case of *N. nabo* is interesting, for the Malayan race is identical with a Burmese form and differs distinctly from the truly Malaysian representative found in Sumatra, Borneo and Java.

The Genera of the *Nacaduba* Group.

Recently, Toxopeus has elevated certain of the *Nacaduba* groups to generic rank but it is difficult to decide how far this process of division is justified.

Toxopeus placed *Catopyrops* (with type *ancyra* Feld.) in his group of *Catochrysopsini* and *Nacaduba* under *Lampidini*, although the claims of *C. ancyra* to generic separation from the true *Nacaduba* species are rather slender. The separation of the small species of the *nora* group is difficult to justify, for while the male genitalia are small and uniform in pattern, it appears impossible to separate certain of the females of the *nora* and *berenice* groups on venation.

LYCAENINAE.

Nacaduba Mre.

Nacaduba Moore, 1881, *Lep. Ceylon*, (i) : 88. Type = *Lampides prominens* Mre., 1877 (= *Lycaena kurava* Mre., 1857, ssp.).

Prosotas H. H. Druce, 1891, *Proc. zool. Soc. Lond.*, 1891 : 366. Type = *Prosotas caliginosa* Drc., 1891 (= *Lampides dubiosa* Semp., 1878, ssp.).

Eyes hairy. On the fore-wing, veins 12 and 11 are anastomosed for part of their lengths. Hind-wing tailed or tailless. Underside with pale lines or catenulated bands. The male androconia, which are usually present, are circular to spatulate. The male clasper large and varied in pattern in the *pavana* and *berenice* groups, but small and uniform in design in the *nora* group.

Catopyrops Tox.

Catopyrops Toxopeus, 1929, *Tijd. Ent.* 72 : 230. Type = the Javanese subspecies of *Lycaena ancyra* Feld., 1860.

Catopyrops Toxopeus, 1930, *De Soort als functie van Plaats en Tijd*, (Amsterdam) : 146. Type = *Lycaena ancyra* Feld., 1860.

Differs from *Nacaduba* Mre. only in that, on the hind-wing, the origin of vein 7 is nearer the base than the end of the cell. The male androconia spatulate and the male genitalia near to that of *N. kurava* Mre. The fascies of the species in the genus differ from those of *Nacaduba* in the paler colour of the underside and in the presence of two prominent, black, subequal tornal spots on both surfaces of the hind-wing, these spots being orange crowned on the underside.

Includes *C. ancyra* (Feld.) and *C. keiria* (Drc.).

Petrelaea Tox.

Petrelaea Toxopeus, 1929, *Tijd. Ent.* 72 : 242. Type = *Petrelaea dana varia* Tox., 1929.

Antenna rather shorter than in *Nacaduba* Mre., but the venation is similar. The male androconia are distinctive, being narrow and elongated and with club-like ends. The underside markings are very obscure and the hind-wing beneath has two small, black equal tornal spots.

Includes *P. dana* (Nic.) and certain African forms in the *sichela* (Wallengr.) group.

Ionolyce Tox.

Ionolyce Toxopeus, 1929, *Tijd. Ent.* 72 : 236. Type = *Ionolyce helicon javanica* Tox., 1929.

Differs from *Nacaduba* Mre. and the other genera dealt with here in that veins 11, 10 and 9 on the fore-wing are long and parallel, and that vein 11 reaches the wing margin at some distance beyond the cell-end instead of immediately above it. The fore-wing apex and hind-wing tornus are produced, and the fore-wing termen between veins 1 and 5 in the male, and the hind-wing termen between veins 3 and 6 in both sexes are straight. The distinctive male androconia are small and almond-shaped, with 6 to 8 ribs. The underside markings are arranged much as in the *berenice* group.

Monotypical.

Nacaduba Mre.

Key for the separation of the Malaysian species.

(After each specific name is given the wing expanse, in millimetres, of the Malayan representative. With *N. glauconia* and *N. datarica*, the measurements refer to Javanese examples, and with *N. noreia* to Burmese specimens.)

1(16). UnF without pale basal lines in cell. Tailed.

pavana Group.

2 (3). UnH with a prominent, round, black spot at apex

angusta (♂ 26·5–27·5, ♀ 25–30).

3. UnH without a prominent black spot at apex.

4(15). Un both wings without a black submarginal line.

5 (6). Un markings very broad, diffuse and yellowish, and those on F continuous *pactolus* (♂ 27·5–28·5, ♀ 24·5–30).

6. Un markings comparatively narrow, consisting of separate lunules, narrow and distinct in ♂, broader and more diffuse in ♀.

7(12). UnH with white stripes in spaces 4 and 5 straight and conjoined.

8 (9). UnF upper portion of discal band strongly arched. Un markings white in both sexes. ♂ upF with black border of variable width, increasing towards the apex (in the Malayan race this border is nearly 3 mm. wide at F apex). ♀ up pale silky purple-blue, with comparatively narrow and uniform brownish-black costal and distal borders *asaga* (♂ 26–33, ♀ 31–34).

9. UnF upper portion of discal band not strongly curved. Un markings pale yellowish in ♂, whiter in ♀.

10(11). ♂F termen very straight, up deep violet-purple, veins darkened. ♀ up deep, silky blue, purple in a side light, with broad, but uniform, bordering to both wings *intricata* (♂ 28·5–31, ♀ 34–36).

11. ♂F termen more rounded, up purple-blue, veins not darkened. ♀ up lustrous purple-blue, with broad black bordering which is continued along inner margin on F: the space between inner and outer submarginal lines on un both wings slightly but distinctly darkened *nabo* (♂ 24–28·5, ♀ 23·5–31).

12. UnH with white stripes in spaces 4 and 5 comma-like and not in line.

13(14). Un greyish-brown, with spaces between inner and outer submarginal lines not darkened. Un markings narrow, in ♂ diffuse and pale yellowish, in ♀ clearly defined and with only a slight yellowish tinge. ♂ up brownish-purple, with very narrow, black, distal border on F. ♀ up shining sky blue, with broad blackish-brown bordering, sometimes heavily dark dusted *hermus* (♂ 21–32, ♀ 23·5–34).

14. Un slate grey, with spaces between inner and outer submarginal lines slightly but definitely darkened. Un markings broader, clearly defined and clear white in both sexes. ♂ up deep violet-purple with broader black bordering. ♀ up as in *hermus*, but bordering blacker in the Malayan race *sanaya* (♂ 25·5–26, ♀ 26·5).

15. Un both wings with a prominent, black, submarginal line *pavana* (♂ 27·5, ♀ 24–26).

16. UnF with a basal pair of pale lines in cell. Tailed or tailless. (See 45; *klanga* in the *nora* group has no basal cell stripes on unF.)

17(29). Un spaces between lines not appreciably darkened.

18(28). Un markings pale yellowish; spaces between lines not broader than usual.

berenice Group.

- 19(26). Tailed.
 20(23). ♂F apex produced.
 21(22). ♂ purple-blue, brown in a side light, un markings rather broad and prominent and wing bases not darkened. ♀ pale shining blue with black borders and prominent white discal area on F
kurava (♂ 23-27, ♀ 22-27).
 22. ♂ deep violet-blue, un markings narrower and less prominent and wing bases darkened. ♀ blackish-brown, with a deep purple wedge-shaped patch on F *beroë* (♂ 23·5-28, ♀ 24-28·5).
 23. ♂F apex rounded.
 24(25). UnF white inner submarginal line becoming fainter at apex, and not zigzagged in spaces 4 and 5. ♂ rather pale, frosted, lavender-blue, with fine black border, which increases towards the F apex. ♀ blackish-brown, with rather obscure pale blue, wedge-shaped patch on F and basal half H blue dusted: both wings with whitish discal areas: rather variable *berenice* (♂ 21-25, ♀ 21-27).
 25. UnF white inner submarginal line fine and distinct at apex, and zigzagged in spaces 4 and 5. ♂ pale bluish-purple, brown in a side light, with black border very narrow throughout. ♀ blackish-brown with lustrous purple-blue, wedge-shaped patch on F
calauria (♂ 20-27, ♀ 20-27).
 26. Tailless.
 27. UnF discal band more confluent than in other members of the group, and basal pale lines rather obscure *glauconia* (♂ 23·5-24).

nora Group.

28. Un markings clear white, spaces between lines on F broader than usual and not darkened in Malayan and Bornean specimens, although may be slightly so in Sumatran examples *aluta* (♂ 19·5-21, ♀ 20-23).
 29. Un with spaces between lines filled in as dark bands.
 30(35). UnF discal band macular, particularly in lower half of wing and spots in spaces 1b and 2 isolated and moved inwards.
 31(32). Un greyish-white, becoming whiter in distal areas. UnF basal band not confined to cell. Tailed *nelides* (♂ 25, ♀ 21-21·5).
 32. Un earthy-brown or ochreous earthy-brown. UnF basal band confined to cell. Tailed or tailless.
 33(34). Un earthy-brown, wing bases not broadly blackened. Tailed
bhutea (♂ 21-22).
 34. Un ochreous earthy-brown, wing bases broadly blackened. Tailless
gracilis (♂ 21·5-23).
 35. UnF discal band more confluent; in spaces 1b and 2 the band is confluent and not composed of isolated spots.
 36(37). Tail minute and scarcely projecting beyond the cilia. Un grey with distal parts of wings whitened *datarica* (♂ 22·5-23·5).
 37. Tailed or tailless. Un dark grey to ochreous.
 38(39). Tailed. Un dusted with ochreous and, usually, discal bands much darker than the ground *nora* (♂ 17·5-22, ♀ 18-19).
 39. Tailless.
 40(45). UnH black submarginal spot in space 2 usual size.
 41(44). Un greyish, with discal bands only slightly darker than the ground. UnH without a prominent black spot at apex.
 42(43). UpF cilia brown throughout. ♂ dull purple-blue, with narrow black bordering. ♀ brownish-black, with wedge-shaped purple patch on F.
dubiosa (♂ 17·5-21, ♀ 17-18).

43. UpF cilia prominently white at apex. Both sexes intense lustrous purple, with broad black bordering. *noreia* (♂ 20).
44. Un fulvous, with blackish marginal spots and brownish-yellow submarginal and discal markings (the latter obsolete in the Sumatran name-type). UnH with a prominent black spot at apex
lutea (♂ 21·5–22, ♀ 23).
45. UnH black submarginal spot in space 2 minute. UnF without basal stripes in cell *klanga* (♀ 20–21).

Five recently described species of the *nora* group (four from Java and one from Borneo), which are not known to me, are not included in the above phylogenetical key but are mentioned in the text under *N. nora superdates*.

1. *Nacaduba angusta kerriana* Dist.

Cupido angusta Druce, 1873, *Proc. zool. Soc. Lond.*, 1873 : 349, pl. xxxii, f. 9 ♂; Borneo.
Nacaduba kerriana Distant, 1884, *Ann. Mag. nat. Hist.* (5) 17 : 353; ♂ Malay Peninsula; 1886, *Rhop. Malay* : 455, pl. xlii, f. 12 ♂.
Nacaduba angusta kerriana Seitz, 1923, *Grossschmett. Erde*, 9 : 914, pl. 152 h 3 ♂ und., 4 ♀, 5 ♀ und.

No difficulty attaches to the separation of this species, which is rare in the forested plains and foothills of Malaya. The subspecies *kerriana* occurs also in Burma and North-east Sumatra, and the other Malaysian races are *angusta* (Drc.) (Borneo), *flumena* Fruh. (W. Java), figured in Piepers and Snellen, pl. xxi, f. 49 a ♂, b ♀, and *honorifice* Fruh. (Nias).

2. *Nacaduba pactolus odon* Fruh.

Lycaena pactolus Felder, 1860, *Sitzb. Akad. Wiss. Wien*, 40 : 456; Amboina. Figured in *Reise Novara Lep.* : 274, pl. xxxiv, f. 1 ♂, 2 and 3 ♀.
Nacaduba pactolus odon Fruhstorfer, 1916, *Zool. Meded.*, 2 : 114; ♂, ♀ North-east Sumatra.
Nacaduba macrophthalma Distant (nec Felder), 1884, *Rhop. Malay* : 218, pl. xx, f. 3 ♂.
Nacaduba pactolus odon Seitz, 1923, *Grossschmett. Erde*, 9 : 914.

In Malaya, the species is local in forest at elevations up to 3500 feet. A male in my collection from the east coast island of Pulau Tioman does not differ from the mainland form. The subspecies *odon* occurs throughout Neomalaya, and *lycoreia* Fruh. is the representative from Java.

N. plumbata H. H. Drc. (pl. 1, fig. 3), from the Solomon Islands, is usually considered to be a race of *pactolus*; an examination of the male genitalia has shown it to be a species quite distinct from any of the "4-line" *Nacadubas* dealt with in this paper.

3. *Nacaduba asaga pendleburyi* subsp. n.

(pl. 1, fig. 29, ♂, 26, ♀.)

Nacaduba pavana asaga Fruhstorfer, 1916, *Zool. Meded.*, 2 : 109; ♂ Borneo.

At first sight, *N. asaga* appears to be very similar to the Bornean representative of *N. nabo* but the male genitalia of the two are totally different. *N. asaga* has more quadrate fore-wings, is greyer, and the inwardly diffuse black border on the fore-wing increases at the apex; on the greyer underside, the purer white markings are broader and of equal intensity over the wing surfaces. In the type of *N. asaga*, the upperside fore-wing black border is broader and more diffuse than in two other males from the Fruhstorfer collection.

The Malayan race of *N. asaga* constitutes a very distinct subspecies differing

on the upperside in the deeper and more purple colour and the broader and more regular fore-wing black border.

♂. Fore-wing apex pointed and costal half of termen rounded; hind-wing apex pointed.

Upperside.—Purple-blue, slightly shining in a side light; inner half of hind-wing densely covered with long, pale greyish hairs; veins prominent on both wings and underside markings faintly visible, except the black ocellus in space 2 of the hind-wing which is clearly visible.

Fore-wing costal and distal margins and hind-wing distal margin with a very fine, clearly defined, black line, which is particularly prominent in spaces 1b and 2 of the hind-wing, where the wing margin is narrowly whitish. On the fore-wing, interiorly to this black marginal line, is a somewhat paler black distal border, inwardly diffuse and increasing markedly (1.5 mm. at the widest part) towards the apex, and continued narrowly along the costal margin. On the hind-wing this inner paler black bordering begins in space 5 and increases rapidly so that almost all the costal area above vein 6 is blackish. The black hind-wing tail at vein 2 is white tipped. Cilia black, becoming whitish at the hind-wing tornus. The circular androconial scales are rather sparsely distributed.

Underside.—Pale greyish-brown with wing bases darkened. The pure white markings are much more comma-like than in any other species of the *pavana* group and recall those of *Anthene goberus* (Godt.). These markings are arranged much as in Malayan *N. hermus* and *N. nabo*, but are of equal intensity over the wing surfaces and are remarkable for the strongly arcuate appearance of the fore-wing discal band above vein 3. The marginal and paired submarginal white lines on both wings, of which those on the fore-wing are straight and in line, are composed of contiguous white stripes, and the submarginal series are rather diffuse. The deep black, rounded spot in space 2 of the hind-wing is inwardly orange crowned, and a minute, rather elongated, black spot in space 1b is heavily overlaid with brilliant purple metallic scales and is inwardly orange crowned. Cilia pale greyish-brown, tipped with white. Thorax and abdomen black above with bluish hairs; whitish below and laterally blackened.

Wing expanse 30.5 mm.

Holotype. MALAY PENINSULA: Pahang, Fraser's Hill, 4200 feet, 19.vii.1936 (*H. M. Pendlebury*). In British Museum. Other males from the same locality and from Penang Hill (2000 feet) show that the principal variation is in the width of the fore-wing black border.

♀. *Upperside*.—The pale purple-blue colouring, which is lustrous in a side light, becomes obsolete in the distal third of both wings. The underside markings are visible from above, and both wings have a fine, deep black, marginal line. The fore-wing has a rather regular, but inwardly diffuse, brownish-black, costal and distal border, which is about 2 mm. wide at the termen. The hind-wing fuscous, interneural, submarginal streaks are bordered on both sides by whitish, and there is the usual fuscous, rather sinuate, inner submarginal line: the streak in space 2 is large and black and inwardly crowned with greenish-blue. The hind-wing black tail is white-tipped.

Underside.—Pale brownish-grey, with the slightly broader white markings arranged as in the male, but those in spaces 1b and 2 on the fore-wing more diffuse. There is no darkening of the wing bases.

Wing expanse 34 mm.

Allotype. MALAY PENINSULA: Pahang, Fraser's Hill, 4000 feet, 24.x.1933 (*H. M. Pendlebury*). In British Museum.

A female in the Selangor Museum (Selangor, Bukit Kutu, 3500 ft., 22.iii.1931 (*H. M. Pendlebury*)), with wing expanse 31 mm., differs from the allotype in the browner underside and rather narrower strigae. Both specimens have the

upper half of the discal band on the fore-wing beneath prominently and uniformly curved, as in the male, a character serving to separate *N. asaga* from all other 4-line *Nacadubas*.

4. *Nacaduba intricata* sp. n.

(pl. 1, fig. 28, ♂, 34, ♀.)

This new species gives the impression of a *N. pactolus* race with very narrow and regular pale markings on the underside. The Nicobar *N. pactolus* race *macrophthalma* (Feld.) has very narrow underside markings, but a study of the male genitalia has shown *odon* and *macrophthalma* to be conspecific and quite distinct from the new species, of which only two males and two females are known to me :

♂. Resembles *odon* ♂, but the fore-wing apex more pointed and the termen straighter.

Upperside.—Dull, deep violet-purple, with the veins darkened and without the silvery hue of *odon*. Wings with very narrow black marginal borders as in *odon*. Hind-wing tail and cilia of both wings as in *odon*. Androconia circular.

Underside.—Greyish-brown, darker than in *odon*, with a slight darkening towards the wing bases. The pale yellowish markings, which are arranged as in *lysa*, are narrow, regular and sharply defined, broader and more diffuse than in *lysa*, but much less so than in *odon*. The marginal and paired submarginal lines on both wings are composed of pale stripes, the submarginal series rather lunulate and tending to obsolescence towards the wing apices, while the diffuse inner submarginal line is the most prominent. On the hind-wing, the deep black ocellus in space 2 is inwardly crowned with deep orange, sparsely overlaid with blue metallic scales, and is neater than in *odon* : in space 1b are two minute black dots, heavily overlaid with blue metallic scales and inwardly bordered with deep orange.

Cilia pale greyish-brown, tipped with white.

Thorax and abdomen black above, below whitish and blackened laterally.

Wing expanse 31 mm.

Holotype. MALAY PENINSULA : Selangor, Bukit Kutu, 3485 feet, 11.iii.1931 (A. S. Corbet). In my collection.

A British Museum male from Mergui, King Island, xii.1925 (*Brigadier W. H. Evans*), with a wing expanse of 28.5 mm., hardly differs from the Malayan holotype.

♀ *Upperside*.—Deep silky blue, purple in a side light, with broad, uniform, dark brown costal and distal borders on both wings. The fore-wing distal border increases slightly towards the apex, being 3 mm. at the widest part, while the hind-wing distal border is about 2 mm. throughout. The hind-wing lacks a submarginal row of dark spots, found in other Malaysian females of the *pavana* group, but has a large, dark marginal spot in space 2, dusted with purple and edged with rusty-red. Hind-wing tailed as in the male.

Underside.—Pale brown, with the pale buff strigae arranged as in the male, although these markings are broader (but not nearly as broad as in *odon* ♀) and more widely spaced. As in the male, the pale inner submarginal streaks in spaces 7, 6, 5 and 4 on the hind-wing, are highly lunulate, and there is a large black marginal spot in space 2, followed by a smaller, double black spot in space 1b, both orange crowned. Wing bases slightly darkened.

Wing expanse 34 mm.

Allotype. MALAY PENINSULA : Pahang, iii.1921. In British Museum, ex Coll. Brigadier W. H. Evans.

The Selangor Museum has a female from Selangor (Bukit Kutu, 3400-3500 feet, 17.iii.1931 (*H. M. Pendlebury*)).

5. *Nacaduba nabo swatipa* subsp. n.

(pl. 1, fig. 35, ♂, 27, ♀.)

Nacaduba pavana nabo Fruhstorfer, 1916, *Zool. Meded.* 2 : 108; ♂ Assam.

Externally, the males of *N. nabo* and *N. hermus* are very similar, although the genitalia differ widely: the violet-blue colouring in Ceylon and India becomes more purple in Malaysia, and reverts to a bluer tone in the eastern parts of the Archipelago. In *N. nabo* the black distal bordering above is reduced almost to vanishing point, but is more prominent, particularly at the fore-wing apex, in *N. hermus*. In the latter species also the males exhibit a deeper hue, and appear brown in a side light. The female *N. nabo* has the same pattern as that sex of *Jamides bochus* (Cr.) above, but the lustrous purple-blue colouring is more restricted and the fore-wing black distal border is continued along the inner margin for nearly half the length of the wing. One of the most constant differences between the sexes of Malaysian *N. nabo* and *N. hermus* is that the outer white discal lines in spaces 4 and 5 on the hind-wing beneath are conjoined and in line in *N. nabo* and separate and more comma-like in *N. hermus*: the appreciable darkening (not blackening) of the space between the inner and outer submarginal lines on the underside is a ready means of differentiating the female *N. nabo* from all other Malaysian females of the *pavana* group.

♂. Differs from the subspecies *valvidens* Tox. (1929, *Tijd. Ent.*, 72 : 233), from West Java, in the less pointed fore-wing, in the darker and bluer purple-blue colour of the upper-side, and in that the inner area of the hind-wing is clothed with pale blue, instead of pale purple hairs. The narrow black distal border on both wings, which increases towards the hind-wing tornus, is darker and broader than in *valvidens*. The underside markings are scarcely visible from above, instead of slightly so, and the hind-wing tornal spot is much less prominent.

The underside differs from *valvidens* only in the slightly darker ground.

Wing expanse 28 mm.

Holotype. MALAY PENINSULA: Selangor, Ampang Forest Reserve, 20.v.1928 (A. S. Corbet). In my collection. A male in the Selangor Museum from Bukit Kutu resembles the type.

Males in the British Museum from the Karen Hills are similar to *swatipa* but males from Ataran are nearer to typical *nabo*, with a more purple upperside and showing a tendency for the spaces between the broader white markings on the underside to be darkened. The males from Java, Sumatra and Borneo are not separable.

♀. *Upperside*.—Deep, lustrous purple. Fore-wing with broad, black costal and distal borders, the latter being turned inwards at the tornus, and a black cell-end spot. Hind-wing blackish-brown with the purple colour confined to the cell, and the veins dark dusted in the distal half; the submarginal spots ringed with white and a prominent black marginal line. Cilia black on fore-wing and black, tipped with buff-brown, on the hind-wing.

Underside.—Pale but warm, greyish-brown with markings as in the male. The white markings are broad and the inter-spaces are darkened, while the space between the inner and outer submarginal lines on both wings is considerably darker than the ground.

Wing expanse 26 mm.

Allotype. MALAY PENINSULA: Negri Sembilan, Bukit Tangga, 17.i.1930 (Brigadier W. H. Evans). In British Museum.

Selangor Museum females from Malaya (all taken above 3000 feet) and from Siam (Hat Sanuk) show that the extent of the purple colour on the hind-wing is subject to variation.

N. nabo is represented in the British Museum from Ceylon, South India, Assam, Burma, Andamans, Nicobars, Siam, Sumatra, Java, South Borneo, Moluccas and Philippines and it has been found that the following names refer to *nabo* subspecies: *sidoma* Fruh. (South India), *vicania* nom. nov. for *major* Evans* preoccupied by *major* Rothschild.† (Nicobars), *validens* Tox. (Java), *minja* Fruh. (Lombok) and *tairēa* Fruh. (Philippines).

6. *Nacaduba hermus lysa* Fruh.

(pl. 1, fig. 31, ♂, 23, ♀.)

Lycaena hermus Felder, 1860, Sitzb. Akad. Wiss. Wien, **40** : 457; ♂ Amboina.

Nacaduba pavana lysa Fruhstorfer, 1916, Zool. Meded., **2** : 109; ♂, ♀ North-east Sumatra.

Nacaduba macrophthalma Distant (nec Felder), 1886, Rhop. Malay. : 454, pl. xlv, f. 8 ♀.

Nacaduba pavana lysa Seitz, 1923, Grossschmett. Erde, **9** : 913, pl. 152 i 8 ♀.

The male of *N. hermus* differs from the closely allied *N. sanaya* as stated in the key: the genitalia of the two are similar but *N. sanaya* can be recognised by the angular process at the anal end of the clasp. The female *N. hermus* is quite different from that of *N. nabo* but similar to the same sex of *N. sanaya*. The female *N. hermus* is pale blue, shining lustrous in a side-light and with the fore-wing black bordering variable in width: in some specimens there is extensive dark dusting, giving the upperside a very dingy appearance.

In Malaya, *N. hermus* is confined to the forest and occurs at altitudes up to 4500 feet, and females greatly outnumber males.

N. hermus is represented in the British Museum from Assam, Burma, Malaya, Sumatra, Borneo and the Moluccas. I have not seen the types of *subperusia* (Snell.), from Java, but follow Toxopeus and place it as a *N. hermus* race: it is evident, however, that the description of the female refers to a *N. pavana* or *N. nabo* form, while the female figured in Piepers and Snellen, pl. xxi, f. 50 d appears to be *N. pavana* and not a *hermus* form, as stated by Toxopeus. The male genitalia of *lysa* have been figured by Fruhstorfer (1916, loc. cit., pl. iv, f. 1).

7. *Nacaduba sanaya elioti* subsp. n.

(pl. 1, fig. 32, ♂, 25, ♀.)

Nacaduba pavana sanaya Fruhstorfer, 1916, Zool. Meded., **2** : 109; ♂, ♀ Nias.

The Malayan and Bornean representatives of *N. sanaya* are rather similar and both differ from the race *naevia* Tox., from Java, and from the nominotypical form from Nias.

♂. Fore-wing more rounded than in *lysa* ♂ but the termen straighter than in typical *sanaya* ♂.

Upperside.—Deep violet-blue, contrasting strongly with the more purple colour of *lysa*. The colour is deeper and bluer than in typical *sanaya*, and the underside markings are not as clearly visible.

Underside.—Rich brownish-grey, with the white markings arranged as in *lysa* but these markings are very white and are broader and more clearly defined: there is a slight

* *Nacaduba hermus major* Evans, 1932, Ident. Indian Butt. : 240; Nicobars.

† *Nacaduba berenice major* Rothschild, 1915, Nov. Zool. **22** : 139; Ceram.

darkening between the stripes, particularly between the inner and outer submarginal lines on both wings. As in other *N. sanaya* races, the inner submarginal white lines on both wings are rather broad and inwardly slightly diffuse and do not weaken towards the wing apices. The hind-wing orange-crowned black tornal spot is smaller than in *sanaya*.

Wing expanse 25.5 mm.

Holotype. MALAY PENINSULA: Singapore, 11.vi.1936 (*J. N. Eliot*). In my collection. A second male taken in Singapore by the same collector is similar.

♀. *Upperside*.—Pale, rather shining, sky-blue, with the discal areas whitened on both wings. Differs from *lysa* ♀ in the very deep black fore-wing border, and in the black dusting above vein 5, and in the broader and blacker inner submarginal line on the hind-wing: also the hind-wing submarginal spots are less elongated and more rounded. The fore-wing has a short, dark, cell-end streak as in the Javanese and Balinese *N. sanaya* females.

Underside.—Slate-grey with markings as in *lysa* ♀. The strigae are whiter and more clearly defined, however, and the spaces between the inner and outer submarginal lines are slightly but distinctly darkened.

Wing expanse 26.5 mm.

Allotype. MALAY PENINSULA: Singapore, 26.ii.1936 (*J. N. Eliot*). In my collection.

The only other *N. sanaya* females known to me are the name-type from Nias and two Balinese females which obviously correspond to two Balinese males, with the same data, which were proved to be *N. sanaya* forms by dissection.

According to Toxopeus, the Javanese subspecies *naevia* Tox. is figured in Piepers and Snellen, pl. xxi, f. 50 a ♂, b ♀. This female differs from the Balinese specimens in that the fore-wing distal border is narrower, the hind-wing costal area is not darkened and the spaces between the inner and outer submarginal lines on the underside are not darkened. Nevertheless, I imagine that Toxopeus was correct in his determination.

Males from Ceylon, Mindoro, Mindanao and the Celebes (*metallica* Fruh. is the race from North Celebes), are paler and greyer and the underside markings are clearly visible from above. The Ceylon male has the extensive whitish irroration in the distal halves of both wings beneath, characteristic of Ceylon *Nacaduba* forms.

***Nacaduba sanaya thalia* subsp. n.**

♂. Compared with *elioti* ♂, the fore-wing is more rounded, the upper side is coloured a more livid purple and the black bordering to both wings is broader. The underside is browner than in *elioti* and the strigae are more yellowish.

Wing expanse 29 mm.

Holotype. BORNEO: Sarawak, Mt. Dulit, undergrowth in secondary forest, 10.x.1932 (*B. M. Hobby and A. W. Moore, Oxford University Expedition*). In British Museum.

8. *Nacaduba pavana singapura* subsp. n.

(pl. 1, fig. 30, ♂, 24, ♀.)

Lycæna pavana Horsfield, 1828, *Cat. Lep. Mus. E.I.C.*: 77; ♂, ♀ Java.

Nacaduba pavana Evans, 1932, *Ident. Indian Butt.*: 241, pl. xxvii, f. H 32/5.

♂. The fore-wing termen straighter than in *vajūva* Fruh. ♂ (Hinlap, Siam).

Upperside.—Pale purple-blue, greyish in a side light, with the underside markings

faintly visible. The fine black border on both wings more prominent than in *pavana* ♂ from Java.

Underside.—As in *pavana* and *vajuva*, except that the inner edges of the stripes formed by the white lines are shaded with brown, and the spaces between the inner and outer submarginal lines and between the outer submarginal and marginal lines are black instead of dark brown.

Androconia peg-topped shaped as in other races.

Wing expanse 27.5 mm.

Holotype. MALAY PENINSULA: Singapore, 6.i.1937 (*J. N. Eliot*). In my collection.

♀. Fore-wing termen straighter than in *vajuva* or *pavana* ♀.

Upperside.—Bordering blacker than in the above-mentioned races, and the blue wedge-shaped patch on the fore-wing more clearly defined.

Underside.—Colour and markings as in the male, the white strigae being only very slightly broader.

Wing expanse 26 mm.

Allotype. MALAY PENINSULA: Singapore, 6.i.1937 (*J. N. Eliot*). In my collection.

N. pavana from Assam has rounded fore-wings, while the Burmese representative differs from subsp. *singapura* only in the rather smaller size. The species is rare in Malaya, where the female appears to be less scarce than the male. The female of the nominotypical form is figured in Piepers and Snellen, pl. xxi, f. 50 d.

Other *N. pavana* subspecies are *varia* Evans (Nicobars: a similar form occurs in the Andamans), *visuna* Fruh. (Celebes) and *georgi* Fruh. (Philippines). The male genitalia of *visuna* have been figured by Fruhstorfer (1916, *loc. cit.*, pl. iv, f. 2).

9. *Nacaduba kurava nemana* Fruh.

Lycaena kurava Moore, 1857, *Cat. Lep. Mus. E.I.C.*: 22; ♀ Java.

Nacaduba perusia nemana Fruhstorfer, 1916, *Zool. Meded.*, 2: 134; ♂, ♀ North-east Sumatra.

Nacaduba perusia nemana Seitz, 1923, *Grossschmett. Erde*, 9: 919.

Nacaduba kurava nemana Toxopeus, 1927, *Treubia*, 4: 426.

The male above is shining purple-blue, with the underside markings showing through distinctly; the black bordering on both wings a thread. The underside markings are rather broad and prominent, and the spaces between the white lines are only slightly darker than the ground in the male but appreciably so in the female. The female is readily separated from other females of the *N. berenice* group by its large size and pale, shining blue colour with white discal areas on both wings; the underside is paler than in the male and the markings are broader and more contrasted.

The subspecies *nemana* occurs throughout Neomalaya and, in the Malay Peninsula, it is not uncommon in the forested hills and occasional examples are taken on the plains.

The other Malaysian races are *niasica* Tox. (Nias), *kurava* Mre. (= *agorda* Fruh.) (Java), *baweana* Fruh. (Bawean) and *astapa* Fruh. (Bali). The subspecies *perusia* (Feld.) occurs in the South Moluccas, and it has been confirmed by examination of the male genitalia that the rather similar Australian *parma* Waterhouse & Lyell (= *syrias* Fruh.) is a *N. kurava* race.

Toxopeus described *evansi* (1927, *Treubia*, 9: 424), from East Dawnas, as the dry season form of *N. kurava euplea* Fruh., from Sikkim. The types

of both *evansi* and *euplea* are in the British Museum and it is apparent that both are entitled to subspecific rank, for Sikkimese and Burmese *N. kurava* differ in both sexes. In the larger Sikkim male, the upperside is more transparent, the spaces between the lines on the underside are slightly darker than the ground, and the hind-wing tornal spot is larger and more broadly crowned with orange. The Sikkim female is also larger and has more contrasted markings on the underside as in the male; on the upperside the fore-wing has broad black bordering and the hind-wing is entirely blackish-brown except for the basal blue dusting. A male from Tenasserim, in the British Museum, does not differ from *evansi* and it appears that *ataranica* Tox., from the Ataran Valley, Tenasserim, must fall as a synonym.

10. *Nacaduba beroë akaba* (Drc.).

Lycaena beroë Felder, 1865, *Reise Novara Lep.* : 275, pl. xxxiv, f. 36 ♂; Luzon.

Cupido akaba H. Druce, 1873, *Proc. zool. Soc. Lond.*, 1873 : 350; ♂ Borneo.

Nacaduba atrata akaba Seitz, 1923, *Grossschmett. Erde*, 9 : 919.

Nacaduba beroë akaba Toxopeus, 1927, *Treubia*, 4 : 433.

The male is darker violet-blue than in *N. kurava nemana*, the black bordering on both wings is a thread, and the underside markings are not visible from above: the underside markings are similar to, but narrower and less prominent than, those in *N. kurava* and both wings are noticeably darkened at the bases. In the brownish-black female, there is a wedge-shaped patch of shining purple-blue on the fore-wing, but only the extreme base of the hind-wing is blue dusted and on this wing there is a prominent black submarginal spot in space 2; the greyish-brown underside is darker than in *nemana* and the white markings are much narrower; the wing bases are not darkened, the interspaces are only slightly darker than the ground, but the submarginal spots are appreciably darker.

The species occurs in forested country throughout Malaya, preferring the hills to the plains; females are rare. The Malayan representative is usually referred to as *akaba* Drc., but it could be placed equally well with the Sumatran race *neon* Fruh. (figured in Seitz, pl. 152 k 5 ♂ und. and in Fruhstorfer, 1916, pl. v, f. 7 male genitalia). The other Malaysian races are *jedja* Fruh. (Nias), *javana* Tox. (= *atrata* auctt.) (West Java), figured in Piepers and Snellen, pl. xxi, f. 51 b ♀, and *bimaculosa* Tox. (East Java).

11. *Nacaduba berenice icena* Fruh.

Lycaena berenice Herrich-Schäffer, 1869, *Stettin. ent. Ztg.*, 30 : 74; Rockhampton.

Nacaduba berenice icena Fruhstorfer, 1916, *Zool. Meded.*, 2 : 127; ♂, ♀, North-east Sumatra.

Nacaduba berenice icena Seitz, 1923, *Grossschmett. Erde*, 9 : 918, pl. 152 h 8 ♀, 9 ♂ und.

The subspecies *icena* is not uncommon in the forested plains and foothills of Malaya, and occurs also in Sumatra and Borneo. Other Malaysian *N. berenice* races are *aphana* Fruh. (Nias), *isana* Fruh. (Java), figured in Piepers and Snellen, pl. xxi, f. 53 b ♀, and *rapara* Fruh. (Bawean). Examination of the male genitalia of the types of *icena* and *aphya* Fruh. (Siam) has confirmed their conspecificity with *N. berenice* (H. Sch.) from Queensland.

Some confusion has arisen over the Ceylon race of *N. berenice*. Fruhstorfer described *N. berenice ceylonica* in 1916 (*loc. cit.* : 127), but this name is invalid as Fruhstorfer denominated the Ceylon race of *N. pactolus* as *ceylonica* a few pages previously (*loc. cit.* : 114). Toxopeus has shown (1927, *Treubia*, 9 : 432, pl. xi, f. 3 male genitalia) that Fruhstorfer's *N. berenice ceylonica*, which is figured in Swinhoe, *Lep. Ind.*, pl. 658, f. 3 c ♂, d ♀, is a species distinct

from *N. berenice* and he has named the true Ceylon *N. berenice* race *ormistoni*. The oldest valid name for the species described as *N. berenice ceylonica* Fruh. appears to be *sinhala* Ormiston, 1924, *Butt. Ceylon*, pl. vii, f. 8, male genitalia.

12. *Nacaduba calauria malayica* subsp. n.

(pl. 1, fig. 33, ♂, 4, ♀.)

Lycaena calauria Felder, 1860, *Sitzb. Akad. Wiss. Wien*, 40 : 457; ♂ Amboina.

Nacaduba beroë Distant (nec Felder), 1884, *Rhop. Malay.*, pl. xx, f. 17 ♂.

♂. *Upperside*.—Both wings rich bluish-purple, brown in a side light, with an exceedingly narrow black distal border and the underside markings scarcely visible from above. The hind-wing tail black with a white tip.

Underside.—Greyish-brown, with narrow white markings as in *icena* ♂, but the spaces between the lines only very slightly darker than the ground. On both wings the narrow white marginal and submarginal lines are clearly defined and, in contrast to *icena*, the fore-wing inner submarginal line becomes finer and more distinct towards the apex and is very distinctly zigzagged in spaces 4 and 5.

The new subspecies resembles the Javanese race *cypria* Tox., figured in Piepers and Snellen, pl. xxi, f. 53 a ♂, but is deeper purple above, darker beneath, and the underside markings are not so clearly visible from above.

Wing expanse 24 mm.

Holotype. MALAY PENINSULA: Selangor, Ampang Forest Reserve, 9.ii.1930 (*A. S. Corbet*). In my collection. Other males from forested localities in Perak and Selangor at altitudes up to 3485 feet:

♀. In both wings the termen is straighter than in other Malayan species of the *N. berenice* group.

Upperside.—Dull, blackish-brown, with a very narrow, black line on the distal margin of both wings. The fore-wing has the usual wedge-shaped coloured patch, which is purple-blue, shining deeper blue in a side light, and on the blackish-brown distal border, a series of dark, but obscure, submarginal spots, increasing in size towards the tornus, can be traced. The underside markings are faintly visible. The hind-wing has two rows of dark brown submarginal spots, of which the outer series is more prominent: in both series the spots are inwardly defined by obscure, whitish lines, and in the outer series, which increase in size towards the tornus, the spot in space 2 is large and black, inwardly very narrowly girdled with pale blue and outwardly defined by a white line. The underside markings are faintly visible and the basal half of the wing is very sparsely dusted with purple-blue (visible in a side light). The black tail at vein 2 is white-tipped. Cilia dark brown, becoming paler towards the hind-wing tornus.

Underside.—Pale greyish-brown with white markings arranged as in the male, but these markings are whiter and slightly broader. As in the male, the inner submarginal white line is sharply zigzagged in spaces 4 and 5 of both wings. The spaces between the marginal and inner and outer submarginal lines are darkened on both wings. Cilia pale greyish-brown, outwardly whitened on the hind-wing.

Wing expanse 24 mm.

Allotype. MALAY PENINSULA: Negri Sembilan, Gunong Angsi, 2600 feet, 22.viii.1928 (*A. S. Corbet*). In my collection.

A Selangor Museum female from Perak (Larut Hills, 3700–4500 feet, 15.ii.1932 (*H. M. Pendlebury*)), with wing expanse 37 mm., differs from the allotype in that the fore-wing wedge-shaped patch is shining green, except for the basal third which is purple-blue: the underside is identical with that of the Negri Sembilan female.

A long series of both sexes from Singapore, taken by Messrs. C. F. Cowan and J. N. Eliot, to whom I am indebted for the privilege of examining their specimens, differs from the mainland examples in my collection in the deeper black on the upperside in both sexes, the much bluer colour of the male and the very prominent lustrous blue patch on the fore-wing of the female. It is possible that the Singapore specimens represent a new subspecies, but it is possible that the colour differences are attributable to the different ages of the specimens.

According to Toxopeus, who took the species *in copula* in Buru, the Malayan female is figured in Distant, *Rhop. Malay.*, pl. xx, f. 16: but for its smaller size and rather zigzag submarginal lines on the underside, the figured specimen agrees quite well with a Malayan female of *N. beroë* in my collection.

For the Ceylon race of *N. calauria*, described as *evansi* Tox. (1927, *Treubia*, 9: 434) but preoccupied by *N. kurava evansi* Tox., the name ***N. calauria toxopeusi*** nom. nov. is proposed after Dr. L. J. Toxopeus, who first differentiated the species from *N. berenice*.

13. *Nacaduba aluta nanda* Nic.

Cupido aluta H. Druce, 1873, *Proc. zool. Soc. Lond.*, 1873: 349, pl. xxxii, f. 8 ♂ (poor); Borneo; also 1895, *Proc. zool. Soc. Lond.*, 1895: 578, pl. xxxii, f. 13 ♂, 14 ♀ (both good).

Nacaduba nanda de Nicéville, 1895, *J. Bombay nat. Hist. Soc.*, 10: 34, pl. S, f. 23 ♂; North-east Sumatra.

Nacaduba aluta nanda Seitz, 1923, *Grossschmett. Erde*, 9: 916.

This species is remarkable in that the spaces between the white lines on the underside are broader than usual: in the Bornean and Sumatran forms these spaces are only slightly darker than the ground, but they are heavily darkened in the Burmese subspecies *coelestis* Nic.

The species is rare in Malaya and 3 males and 2 females in my collection were taken singly on forest roads at elevations up to 2000 feet.

The species has been recorded from Java by Toxopeus, and a further Malaysian race is *lessina* Fruh. (Nias), the nominotypical form, which differs but little from *nanda*, is figured in Seitz, pl. 154 b 3 ♂, 4 ♀.

14. *Nacaduba nelides* Nic.

(pl. 1, fig. 1, ♂, 5, ♀.)

Nacaduba nelides de Nicéville, 1895, *J. Bombay nat. Hist. Soc.*, 9: 280, pl. O, f. 24 ♂; North-east Sumatra; West Java.

This species has much the same underside pattern as *N. gracilis* and *N. bhutea*, but differs distinctly from these in the pale greyish-white ground colour which becomes appreciably whiter in the distal half of each wing, in the very distinct white lines defining the spots, and in the prominent submarginal markings which are highly zigzag on the hind-wing. Above, the male is a deep, rather brown, violet-blue, and both wings, particularly the hind-wing, are heavily overlaid with pale greyish hairs: the black distal border, which is inwardly diffuse, is rather broad, and increases towards the apex on both wings; the cilia are black tipped with white. The figure accompanying the original description of the male *N. nelides* is not good.

The female of *N. nelides* has not yet been described.

♀. *Upperside*.—Pale, shining, lavender-blue, becoming darker in a side light, and with the veins narrowly dark-dusted. Fore-wing with broad, black costal and distal borders,

increasing somewhat at the apex. Hind-wing with broad, black costal and distal borders and, on the latter, is superimposed an interneural series of black dots, defined by rather obscure whitish haloes; the spot in space 2 is larger and darker than the rest and, on its inner side, the halo is blue-dusted. *Cilia* on both wings black tipped with white.

Underside.—As in male, but whiter and with the discal series of spots on both wings arranged in a more regular series (the spot in space 4 of the fore-wing is quadrate and not lengthened and set at an angle as in the male, and the spot in space 6 of the hind-wing is quadrate and of the same size as those on either side of it and not small and circular as in the male).

Wing expanse 24 mm.

Neallotype. MALAY PENINSULA: Pahang, Fraser's Hill, 4250 feet, 3.vi.1932 (*Dr. J. W. Scharff*). In my collection. A second female from Perak, Maxwell's Hill, 3800 feet, 13.ix.1929 (*A. S. Corbet*) does not differ. The Selangor Museum has a pair taken *in cop.* (Fraser's Hill, 4000 feet, 31.v.1932 (*H. M. Pendlebury*)).

In Malaya, the species is confined to the forested hills and, on occasion, is locally common, although females are always rare.

The west Javanese *N. glauconia* (Snell.) (= *glauca* (Snell.) *praeocc.*), figured on plate 1, f. 7 and in Piepers and Snellen, pl. xxi, f. 55 ♂, has the underside markings arranged much as in *N. nelides*, but is paler on both surfaces, and the discal bands are much more confluent. The male genitalia of *N. glauconia* and *N. nelides* differ widely, however, and the absence of a tail in the former is further proof of their specific distinctness. The *N. glauconia* subspecies from East Java is *overdijkinki* Tox.

15. *Nacaduba bhutea* Nic.

Nacaduba bhutea de Nicéville, 1884, *J. asiat. Soc. Bengal*, 52 : 72, pl. i, f. 13 ♂; Sikkim.

Nacaduba nora bhutea Seitz, 1923, *Grossschmett. Erde*, 9 : 915, pl. 154 c 6 ♂ (underside poor).

In both *N. bhutea* and *N. gracilis*, the underside is rather ochreous earthy-brown and, in the fore-wing macular discal band, the spot in space 4 is elongated and set at an angle, while the spots in spaces 1 and 2 are detached and shifted inwards.

N. bhutea is occasionally common on some of the Malayan hill stations at elevations between 2000 and 5000 feet: it was recorded from Malaya as *N. glauca* by Evans (1933, *J.F.M.S. Mus.*, 17 : 407). As far as can be ascertained, it is confined to the mainland of Asia.

The Javanese species *N. datarica* (Snell.), figured on plate 1, f. 2 and in Piepers and Snellen, pl. xxi, f. 57 a ♂, pertains to the *bhutea* group, but differs from *N. bhutea* Nic. in the male genitalia, in the distinct whitish irroration in the distal half of the underside of both wings, and in the presence of a minute tail which hardly projects beyond the cilia. Toxopeus (1929, *loc. cit.* : 238) incorrectly placed *datarica* as a *N. bhutea* subspecies.

16. *Nacaduba gracilis* ni Nic.

Plebeius gracilis Röber, 1886, *Deuts. ent. Z.* "Iris," 1 : 67, pl. v, f. 1 ♂; Ceram.

Nacaduba ni de Nicéville, 1902, *J. Bomby nat. Hist. Soc.*, 14 : 247, pl. FF, f. 8 ♂; North-east Sumatra; West Java.

Nacaduba ni Seitz, 1923, *Grossschmett. Erde*, 9 : 916, pl. 154 c 5 und. (poor).

In Malaya, *N. gracilis* is rare and is taken singly on the forested plains and foothills. It occurs also in Borneo, and the Javanese subspecies *donina* (Snell.) is well figured in Piepers and Snellen, pl. xxi, f. 59 ♂.

17. *Nacaduba nora superdates* Fruh.

Lycaena nora Felder, 1860, *Sitzb. Akad. Wiss. Wien.*, **40** : 458 : ♂, ♀ Amboina. Figured in *Reise Novara Lep.* : 275, pl. xxxiv, f. 34 ♂.
Nacaduba nora donina f. *superdates* Fruhstorfer, 1916, *Zool. Meded.*, **2** : 117 : ♂ Java. Figured in Piepers and Snellen, pl. xxi, f. 60 a ♂, b ♀.
Nacaduba aluta Distant (nec Druce), 1884, *Rhop. Malay.* : 220, pl. xx, f. 13 ♂, 14 ♀.
Nacaduba nora donina f. *superdates* Seitz, 1923, *Grossschmett. Erde*, **9** : 916.

Toxopeus (1929, *Tijd. Ent.*, **72** : 227, 240) considered *parrhasius* F. to be the correct name for the collective species known as *N. nora*, and it is clear that the original description of *parrhasius* cannot refer to the *Everes* species for which the Fabrician name is usually reserved. Professor G. D. Hale Carpenter has kindly compared a Malayan *N. nora* with the figure in Jones' *Icones* (6, pl. xvi. f. 2) (which is at the Hope Department University Museum, Oxford), referred to in the original description of *parrhasius*, and found that the species depicted could not possibly be confused with *N. nora*.

N. nora differs from *N. dubiosa* (Semp.), not only in the different male genitalia and in the possession of a tail, but in the much narrower black bordering on the distinctly bluer upperside, and in the dark submarginal line on the hind-wing beneath not being prominently zigzagged in the male. In females of *N. nora* and in both sexes of *N. lutea* the underside is distinctly ochreous.

N. nora is undoubtedly a variable species, but the form from Malaya, Sumatra and Borneo is hardly separable from the Javanese subspecies *superdates* Fruh. In the Peninsula, it is common and widely distributed at all elevations, although most abundant on the forested plains and foothills.

There are two males in the Selangor Museum (Pahang, Fraser's Hill, 4250 feet, vii.1936 (*H. M. Pendlebury*)), which differ from typical *superdates* in the more pointed fore-wing apex and in the pale greyish underside, in which the ochreous dusting is very faint in the distal half of both wings and the markings are paler, narrower and more confluent. In one specimen the upperside is bright purple and in the other it is darker and bluer. The British Museum has a similar male from Java (Tjibodas, Mt. Gede, 4600 feet, 22.iv.1922 (*C. L. Collenette*)), which was taken at the same locality and on the same day as a normal male. The male genitalia and androconia of the two forms appear to be identical.

Other *N. nora* races are *formosana* Fruh. (Formosa), *ardates* (Mre.) (Cashmere), figured in Seitz, **9**, pl. 154 a 6 ♂ und. and perpetuating the error in Moore's original figure (*Proc. zool. Soc. Lond.*, **1874**, pl. lvii, f. 1 ♂) showing the specimen without tails, *dilata* Evans (Nicobars), *kupu* (Kheil) (Nias), *meraha* Fruh. (Engano) and *semperi* Fruh. (Bazilan), figured in Seitz, **9**, pl. 154 a 9 ♀, 10 ♂ und. *N. felderi* (Murray), from Australia, may be a distinct species.

Four Javanese species of the *N. nora* group, recently described by Toxopeus, are not known to me. Of these, *N. subardates* and *N. hybrida* are tailless, while the two tailed species *N. pia* and *N. norina* resemble *N. nora* closely. In *N. subardates*, the underside is dark grey, the fore-wing discal series of spots is completely broken at vein 5, and the hind-wing is rather pointed at vein 2; in *N. hybrida*, which appears also to be close to *N. dubiosa*, the underside is browner, the spots comprising the fore-wing band are arranged *en échelon* and the large hind-wing tornal spot is crowned with pale yellow instead of orange. Both *N. pia* and *N. norina* are purple above, the former having the deeper colour. On the underside of *N. pia*, the markings are rather broad and the small hind-wing tornal ocellus is inwardly crowned by a pointed

yellow ring. In *N. norina*, the smallest of the tailed species, the ground colour of the underside is brownish-grey, without any ochreous tinge, and the markings are fine.

N. ella (Tox.), described from the central Celebes and recorded also from Borneo, appears to differ from *N. nora* primarily in the large and deep black ocellus, which is not orange-crowned, on the hind-wing beneath. I have seen no specimens and am rather dubious regarding its specific identity.

18. *Nacaduba dubiosa lumpura* subsp. n.

Lampides dubiosa Semper, 1878, *J. Mus. Godeffr.*, **14** : 159; ♂ Bowen, Queensland.

This species was formerly considered to be the "tailless form of *N. ardates* Mre.," but its specific status can no longer be questioned. In Malaya, it is usually scarce on the roadsides in the forested plains and foothills; on 6th March, 1930, however, it occurred in large numbers among the grass of the roadsides on the outskirts of Kuala Lumpur and, of the large number examined then and 21 specimens which were retained and are before me now, all were the usual form of the male of the Malayan representative of *N. dubiosa*. The much scarcer female has the underside of the male and, on the blackish-brown upperside, the fore-wing has a wedge-shaped patch of deep purple and the hind-wing bears a black, submarginal spot in space 2.

N. dubiosa from Malaya, Borneo, Nias and Christmas Island differs from the subspecies *indica* Evans, from Ceylon and South India, and constitutes a new subspecies.

♂. *Upperside*.—Paler, more purple blue, and with black distal bordering on both wings more regular than in *indica* ♂ from Ceylon. On the hind-wing, the costal area is not darkened as in *indica*.

Underside. Ground colour browner, but markings arranged exactly as in *indica*.

Wing expanse 22 mm.

Holotype. MALAY PENINSULA: Selangor, Kuala Lumpur, 6.iii.1930 (*A. S. Corbet*). In my collection.

♀. *Upperside*.—Pale, rather purplish-brown. On the fore-wing, the deep purple wedge-shaped patch of *indica* ♀ almost obsolete. The hind-wing has a submarginal series of dark brown spots, with an enlarged black spot in space 2.

Underside as in the male.

Wing expanse 17 mm.

Allotype. MALAY PENINSULA: Selangor, Kuala Lumpur, 25.iv.1931 (*A. S. Corbet*). In my collection.

The Javanese race *roepkei* (Tox.) is said to differ in the narrower distal border above, and in the lighter grey underside and smaller hind-wing ocellus: it is figured in Piepers and Snellen, pl. xxi, f. 58 ♂.

N. noreia (Feld.), from Ceylon, with races *hampsoni* Nic. (South India and Burma) and *cyclops* (Tox.) (Java), differs from *N. dubiosa* as stated in the key: the Javanese form is not known to me.

19. *Nacaduba lutea sivoka* Evans.

Nacaduba lutea Martin, 1895, *Neue Tageschmetz. N.O.-Sumatra*, **1** : 1; ♂♀ North-east Sumatra
Figured in de Nicéville, 1895, *J. Bombay nat. Hist. Soc.*, **10**, pl. S, f. 24 ♀.

Nacaduba sivoka Evans, 1910, *J. Bombay nat. Hist. Soc.*, **20** : 427; ♂ nec "♀" Sikkim.

In this tailless species the sexes are similar: the upperside is deep brown and, while the male has very few pale blue scales, the female has sufficient

in the basal half of the fore-wing to give the impression of a slightly paler and rather blue wedge-shaped basal patch.

The male *N. lutea* has small rectangular androconia, much as in *Catopyrops ancyra*, strongly contrasting with the larger fan-shaped scent scales found in *N. nora* and *N. dubiosa*: the male genitalia of *N. dubiosa* and *N. lutea*, however, hardly differ.

N. lutea sivoka is common from Sikkim to Burma, but it appears to be a rare species on the plains of Malaya; it is represented in the Andaman Islands by the race *fulva* Evans.

20. *Nacaduba klanga* sp. n.

(pl. 1, fig. 6.)

Although only females are known, this new species is so distinctive that I have no hesitation in describing it. It is nearest to *N. lutea sivoka* Evans, but the basal pair of pale lines in the fore-wing cell beneath are absent.

♀. *Upperside*.—Rather dark brown, with the basal half of both wings densely covered with purple scaling. Both wings with a fine, black distal border, and the hind-wing with a series of dark brown submarginal spots, increasing towards the tornus. Hind-wing tailless. Cilia brown, becoming paler distally, and darkening towards the wing apices.

Underside.—Pale shining, greyish-brown, with all markings rather faint. These markings are arranged much as in *dubiosa* but are broader and much more confluent, and both sides of the discal bands are bordered with diffuse whitish. The fore-wing has no basal cell stripes, and in spaces 3, 4, 5 and 6 on the fore-wing and in spaces 2, 3, 4 and 5 on the hind-wing the discal band is very regular and confluent. The distal area of both wings is whitish and the submarginal lines are rather faint, those on the hind-wing being zigzagged. The minute, black submarginal spot in space 2 on the hind-wing is inwardly crowned with reddish-orange: the black spotting in space 1b obsolete.

Wing expanse 21 mm.

Holotype. MALAY PENINSULA: Selangor, Ampang Forest Reserve, 21.iv.1929. In my collection. A second female from Selangor (Kuala Sleh, 14.x.1928, A. S. Corbet), with wing expanse 20 mm., is similar but the upper-side has less purple scaling.

Catopyrops Tox.

1. *Catopyrops ancyra aberrans* (Elw.).

Lycaena ancyra Felder, 1860, *Sitzb. Akad. Wiss. Wien*, **40**: 457; ♂ Amboina. Figured in *Reise Novara Lep.*: 276, pl. xxxiv, f. 5 ♂.

Nacaduba aberrans Elwes, 1892, *Proc. zool. Soc. Lond.*, **1892**: 626, pl. xliv, f. 6 ♂; Burma.

Nacaduba ancyra Seitz, 1923, *Grossschmett. Erde*, **9**: 917 (partim).

Of this widely ranging species, only a male and female have been recorded from the Malay Peninsula (Pendlebury, 1936, *J.F.M.S. Mus.*, **18**: 183). In *aberrans* (Elw.) and the rather similar *pseustis* (Doh.) (= *almora* (H. Drc.)), from Borneo, the underside is pale brownish-grey and the confluent discal bands are not much darker than the ground colour: in the first-named, the bands are broader and rather less confluent and the male upperside is decidedly bluer. In the more easterly forms, the ground colour of the underside is almost white and the macular bands are ochreous-brown.

C. ancyra appears to be a rare species in Malaysia. In addition to the subspecies mentioned above are *nicévillei* Tox. (North-east Sumatra); *hyperpseustis* Tox. (Pulau Weh); *austrajavana* Tox. (Java) to which form presumably

the male figured in Piepers and Snellen, pl. xxi, f. 61 a is referable; *altijavana* Tox. (Mountains of Java) figured in Piepers and Snellen, pl. xxi, f. 61 b ♀: the figure in Seitz, pl. 152 i 3 ♂ und., 4 ♀ and und., agrees with the Flores form and is probably referable to *rita* (Gr. Sm.) (Wetter). The form *gaura* (Doh.) (Sumba) may be an aberration. A Sumatran female in my collection (from Harrangaul, Lake Toba, 3000 feet, 12.v.1930, *A. S. Corbet*) agrees with the description given by de Nicéville (1895, *J. asiat. Soc. Bengal*, 64 : 456) and presents a striking contrast to the dark females of *aberrans* and *pseustis*.

Petrelaea Tox.

1. *Petrelaea dana dana* (Nic.).

Nacaduba? *dana* de Nicéville, 1884, *J. asiat. Soc. Bengal*, 52 : 73, pl. i, f. 15 ♂; ♂♀ North India.
Nacaduba dana dana Seitz, 1923, *Grossschmett. Erde*, 9 : 916.

In this species, the black tornal spots on the underside of the hind-wing are small and nearly equal, the underside markings are more obscure than in any Malaysian *Nacaduba* form, and the hind-wing is not tailed. The distinctive male androconia are narrow, elongated and thickened at both ends. The African species *P. sichela* Wallengr. has fascies similar to *P. dana*, but a comparison of the male genitalia revealed a congeneric but not a conspecific relationship.

The typical form, which is figured in Evans, 1932, *Ident. Indian Butt.*, pl. xxvii, f. H 32/19, is found in India, Malaya, Sumatra and Borneo, while the subspecies *varia* Tox. has been described from Java. In Malaya, *P. dana* is a rare butterfly on the forested plains and foothills. Wing expanse ♂ 18-21.5 mm.

Ionolyce Tox.

1. *Ionolyce helicon merguiana* (Mre.).

Lycaena helicon Felder, 1860, *Sitzb. Akad. Wiss. Wien*, 40 : 457; ♂ Amboina.
Nacaduba merguiana Moore, 1884, *J. asiat. Soc. Bengal*, 53 : 23; ♂ Mergui.
Nacaduba viola Distant (nec Moore), 1884, *Rhop. Malay.* : 219, pl. xx, f. 24 ♂.
Nacaduba viola merguiana Seitz, 1923, *Grossschmett. Erde*, 9 : 917.

The type of *I. helicon* is an abnormally large specimen, but there can be no doubt that Toxopeus (1929, *Tijd. Ent.*, 72 : 236) was correct in regarding *helicon* and *viola* (Mre.) (Ceylon) as conspecific.

I. helicon is common throughout Malaya, although females are rare. A male from Pulau Tioman in my collection does not differ from the mainland form. Wing expanse ♂ 22-23.5, ♀ 20-21 mm. The subspecies *merguiana* occurs from North India to Malaysia, but recently the Javanese form (figured in Piepers and Snellen, pl. xxi, f. 52 a ♂, b ♀) has been separated as *javanica* Tox.

During the course of the present work the following types have been examined at the British Museum :

Nacaduba akaba Dr., *akuta* Dr., *andamanica* Fruh., *angusta* Dr., *aphana* Fruh., *aphya* Fruh., *ardates* Mre., *asaga* Fruh., *astapa* Fruh., *barweana* Fruh., *caliginosa* Dr., *berenice ceylonica* Fruh., *continentalis* Fruh., *dilata* Evans, *dubiosa* Semp., *euplea* Fruh., *kurava evansi* Tox., *formosana* Fruh., *fulva* Evans, *gythion* Fruh., *icena* Fruh., *indica* Evans, *isana* Fruh., *jedja* Fruh., *kurava* Mre., *laurina* Fruh., *lessina* Fruh., *lysa* Fruh., *major* Evans, *meraha* Fruh.,

metallica Fruh., *minja* Fruh., *nemana* Fruh., *neon* Fruh., *odon* Fruh., *pavana* Hsf., *plumbata* Drc., *sanaya* Fruh., *semperi* Fruh., *sidoma* Fruh., *sivoka* Evans, *superdates* Fruh., *tairëa* Fruh., *vajuva* Fruh., and *visuna* Fruh.

Catopyrops : *aberrans* Elw., *almora* Drc., and *keiria* Drc.

Ionolyce : *merguiana* Mre. and *viola* Mre.

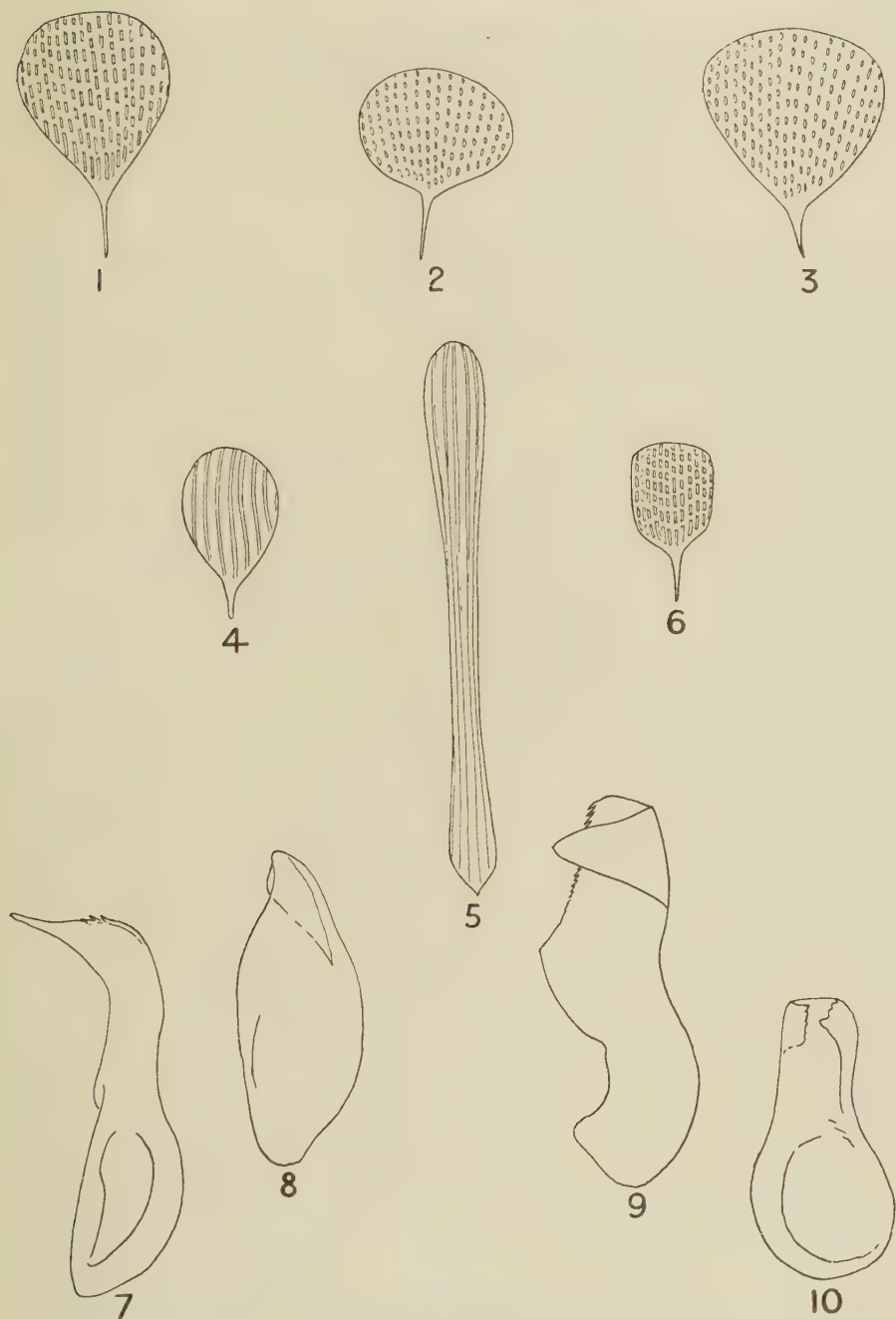
The following types have been examined at Tring Museum :

Nacaduba : *calauria* Feld., *hermus* Feld., *lutea* Mart., *nora* Feld., *pactolus* Feld. and *perusia* Feld.

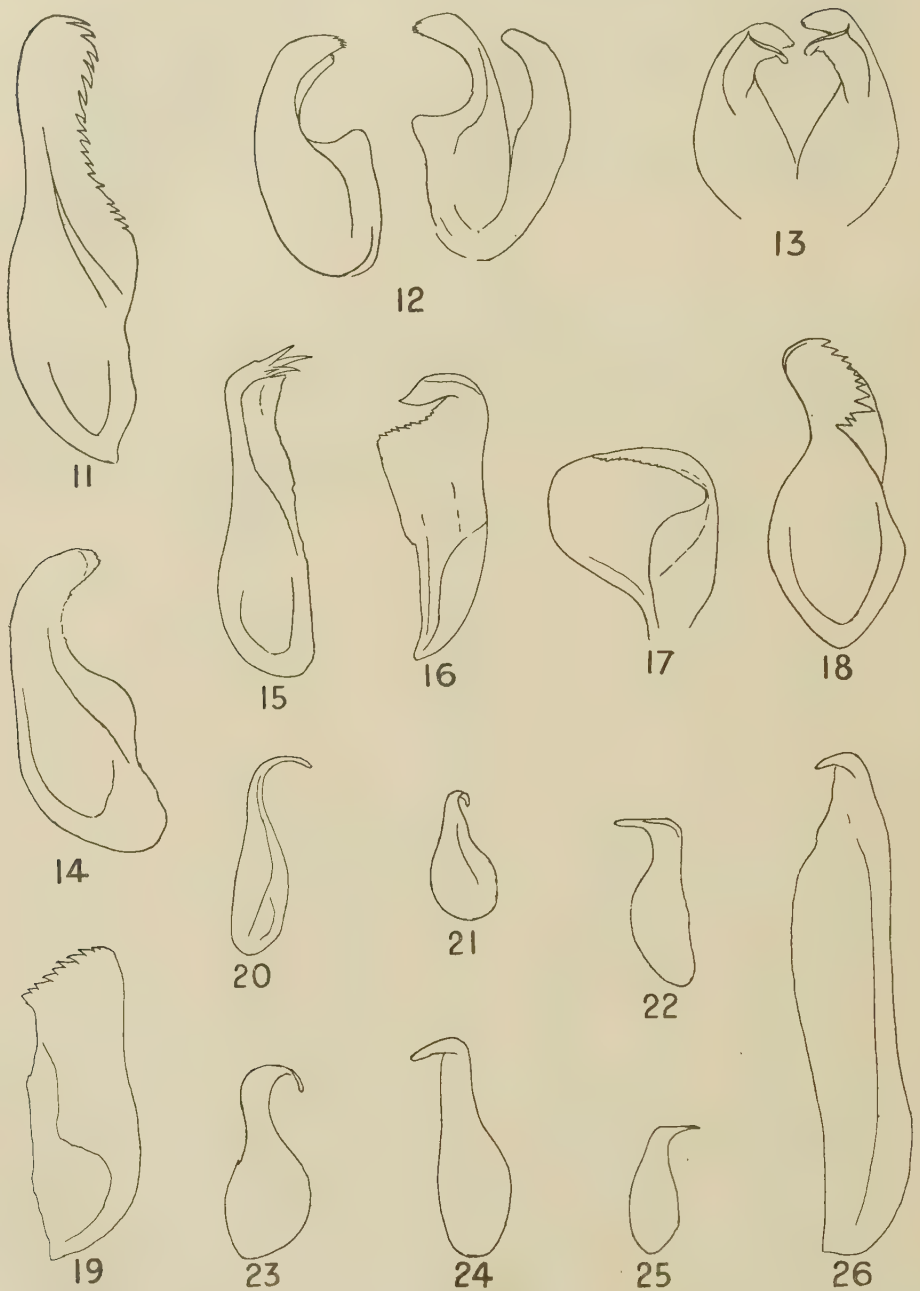
Catopyrops : *ancyra* Feld. and *rita* Gr. Sm.

Ionolyce : *helicon* Feld.

I am indebted to the Trustees of the British Museum (Natural History) for granting facilities for the study of their collections, to the late Lord Rothschild, F.R.S., for permission to examine the Tring types, and to Mr. H. M. Pendlebury for the loan of specimens from the Selangor Museum. To Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O., I am indebted for considerable help and advice throughout the investigation.



FIGS. 1-10.—Male androconia of (1) *Nacaduba pavana singapura* subsp. n., (2) *N. hermus lysa* Fruh., (3) *N. nora superdates* Fruh., (4) *Ionolyce helicon merguiana* (Mre.), (5) *Petrelaea dana* (Nic.), (6) *Catopyrops ancyra aberrans* (Elw.). Male clasper of (7) *N. pactolus odon* Fruh., (8) *N. plumbata* Drc., (9) *N. asaga pendleburyi* subsp. n., (10) *N. intricata* sp. n. (type). All camera lucida drawings of the same magnification.



FIGS. 11-26.—Male clasper of (11) *Nacaduba nabo swatipa* subsp. n. (type), (12) *N. hermus lysa* Fruh., (13) *N. sanaya elioti* subsp. n. (type), (14) *N. pavana vajuvu* Fruh., (15) *N. beroë akaba* (Drc.), (16) *N. kurava nemana* Fruh., (17) *N. calauria malayica* subsp. n., (18) *N. berenice icena* Fruh., (19) *N. glauconia* (Snell.), (20) *N. dubiosa lumpura* subsp. n., (21) *N. aluta nanda* Nic., (22) *N. bhutea* Nic., (23) *N. datarica* (Snell.), (24) *N. nelides* Nic., (25) *N. nora superdates* Fruh., (26) *Petrelaea dana* (Nic.). All camera lucida drawings of the same magnification.

A REVISION OF THE MALAYAN SPECIES OF *JAMIDES* HÜBNER (LEPIDOPTERA : LYCAENIDAE)

By N. D. RILEY and A. STEVEN CORBET, D.Sc., Ph.D.

WITH ONE PLATE AND SEVENTEEN FIGURES.

(Read 2nd February, 1938.)

FRUHSTORFER (1915, *Arch. Naturgesch.* **81** (A) (6) : 1-46) revised the genus *Jamides* in a comprehensive manner, but his figures of the male genitalia are mostly unreliable : the monograph by Seitz (1923, *Grossschmett. Erde*, **9** : 901-912) was based largely on Fruhstorfer's work. Although these authors misidentified several of the older species, their work as a whole, which was in the nature of a pioneer effort, is deserving of high praise.

An annotated list of the Javanese *Jamides* species by Toxopeus (1929, *Tijd. Ent.*, **72** : 230-232) gives the correct names for the Javanese forms in almost all cases, and keys for the separation of the Indian species have been published by Evans (1932, *Ident. Indian Butt.* : 236-239).

In general, the identification of *Jamides* males is comparatively easy : the most satisfactory method of determining females is by comparison with named series but, in the absence of such facilities, the identification of aberrant female specimens may be largely a matter of guesswork.

With *Jamides* the subspecific differences in facies and male genitalia shown in any one sub-region are comparatively slight, but between such sub-regions as Neomalaya (*i.e.* Malaya, Sumatra and Borneo) and Paramalaya (*i.e.* the Sumatran west coast islands extending from Engano towards the Nicobars) these differences may be considerable. The Nicobar races, in particular, are so far removed from the corresponding forms from Malaysia and India that they have some claim to specific status. Nevertheless, there can be no reasonable doubt that such forms as *kondulana* (Feld.) and *kankena* (Feld.) are nothing more than strongly differentiated representatives of the widely distributed *J. alecto* (Feld.) and *J. elpis* (Godt. *nec* auctt.) respectively. With the Nicobar species *J. ferrari* Evans, the name type from Great Nicobar diverges more from the central Nicobar representative, both in facies and male genitalia, than does the latter form from the race found in Malaya and Sumatra.

The Ceylonese *J. lacteatus* (Nic.) is evidently a *J. elpis* race, although the clasper is remarkably broad compared with the Nicobar and Malayan representative. Bornean *J. zebra* (Drc.) and *J. vaneckei* (Fruh.), from Nias, are so similar superficially that their conspecificity can hardly be doubted, yet while of the same general pattern and showing the characteristic terminal protuberance, the clasper of *vaneckei* is much more slender, becoming gradually thickened towards the distal extremity, and the prominent shoulder found in the clasper of *zebra* can hardly be traced. On the other hand, the dissimilarity between *J. coruscans* (Mre.) and *J. philatus* (Snell.), both superficially and in the male genitalia, appears to be too great to justify Toxopeus' view that they are conspecific.

Jamides Hbn.

Jamides Hübner, [1819], *Verz. bek. Schmett.*, (5) : 71. Type = *Papilio bochus* Cr., 1782.

Eyes hairy. On the fore-wing, veins 11 and 12 free throughout, and vein 12 reaches the costa some distance before the discoidal. Hind-wing tailed or tailless. Underside marked with narrow white stripes. Androconia present or absent in the male.

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Most of the species considered in the present paper were placed in the genus *Lampides* Hbn. [1819] by Fruhstorfer and by Seitz, but Grote selected *Papilio boeticus* Linn. as the generic type in 1873 (*Bull. Buffalo Soc. nat. Sci.*, 1: 179) and this fixation is valid. *Cosmolyce* Tox. (1927), with the same genotype, therefore, sinks as a synonym of *Lampides* Hbn.

Key for the separation of the Malaysian species of *Jamides* Hbn.

bochus group.

- 1 (2). Un ochreous-brown, with markings dull and indistinct. UpF black costal border extending into cell. ♂ brilliant metallic blue: no androconia *bochus*.
2. Un grey or brownish-grey, with prominent white markings. UpF black costal border never enters cell. Androconia present in many species.
- 3(31). UnH without a prominent submarginal series of dark, wedge-shaped spots.
- 4(13). UnF with a short white line interposed between the two long basal lines. Androconia present.

celeno group.

- 5(10). UnH with only one basal pair of straight white lines; both sexes pale chalky-blue.
- 6 (7). ♂ upF black border increasing to at least 1 mm. at apex. ♀ dull blue with dull brownish-black border and markings *celeno*.
7. ♂ upF black border a thread. ♀ sky blue, with black border and markings.
- 8 (9). UnH white discal stripes in spaces 6 and 7 in line with those in spaces 4 and 5 *pura*.
9. UnH white discal stripes in spaces 6 and 7 moved out of line with those in spaces 4 and 5 *zebra*.
10. UnH with two basal pairs of straight white lines.
- 11(12). Un markings rather broad with large orange tornal spot on H. ♂ up pale, rather purple-blue, with black submarginal spots in tornal half of H: un markings hardly visible from above. ♀ up blue, with a purple tinge, with black bordering as usual in the group *malaccanus*.
12. Un markings usually narrower, straighter and orange tornal spot on H rather small. ♂ up pale shining blue, with underside markings visible on F, and without submarginal markings on H. Androconia very sparse. ♀ up paler and clearer blue and, in the Sumatran and Javanese forms, with more dark dusting than in *malaccanus* ♀ *parasaturatus*.
13. UnF with two long basal white lines followed by two short white lines. Androconia present in some species.

elpis group.

- 14(28). Up blue in both sexes and not deep metallic green or deep purple.
- 15(27). Un grey or brownish-grey, with the white stripes clearly defined.
- 16(18). Wing expanse less than 26 mm.
17. UnF usually with two or three white costal dashes above the white lines in the cell. ♂ up pale blue, with a greenish tinge, and with a comparatively broad, uniform, black distal border on F: no androconia. ♀ up rather greyish-blue, with broad, uniform, black distal border on F. *talinga*.
18. Wing expanse greater than 26 mm. UnF usually without white costal dashes (except in *limes*). Un pattern and markings of the next six

species very similar, but there is some difference in the width and definition of the white stripes.

- 19(20). ♂ up lustrous morpho-blue, with F black border diffuse and increasing to about 1 mm. at apex : no androconia. ♀ bright sky blue, with F black border broad at apex and narrowing to about 1.5 mm. at tornus. Almost invariably in both sexes the white dash in the centre of space 3 on unF is situated more or less midway between the 3rd and 4th white lines (from the base) and is detached from, and does not form a prolongation of, the 3rd line, as is the case with all other species of the group except usually *abdul* and, frequently, *ferrari* . . . *caeruleus*.
- 20(23). ♂ up pale, shining sky blue, with black border a thread on both wings : H without submarginal spots. ♀ duller blue with broad F border.
- 21(22). Wing expanse under 31 mm. Un white markings rather narrow and clearly defined : H orange tornal spot not remarkably large. Androconia present . . . *elpis*.
22. Wing expanse over 31 mm. Un white markings broad and rather diffuse : F with costal dashes and H orange tornal spot very large. No androconia. ♀ upF border deeper black than in *elpis* . . . *limes*.
- 23(26). ♂ up pale, rather purplish-blue, with a black diffuse border (at least 1 mm. at apex) on F and black, submarginal spots on H. ♀ up pale blue, without dark dusting, and with F black border from tornus to half-way along the costa, and increasing at the apex.
- 24(25). Un white markings broad and rather diffuse. No androconia . . . *alecto*.
25. Un white markings narrow and very sharply defined : interspaces slightly darkened. Androconia present . . . *ferrari*.
26. ♂ up purple-blue, with diffuse black border on F increasing to nearly 1 mm. at apex : H with black submarginal spots. No androconia. ♀ up pale blue, with F apex broadly blackened from tornus to mid-costa and veins dark dusted for several mm. after entering the blue area . . . *cunilda*.
27. Un discal and submarginal white stripes so broad, and with such restricted dark interspaces, that the outer halves of both wings are mostly white and the discal bands can be traced only with difficulty. No androconia . . . *lucide*.
28. Up deep purple or metallic green. (*abdul* ♀ is pale purple-blue with very broad borders to both wings and a broad black costal border on F.)
- 29(30). Up deep purple in both sexes. Un deep buff brown, with narrow, straw-coloured stripes. No androconia . . . *lugine*.
30. ♂ up metallic green, ♀ pale purple-blue, with broad borders in both sexes. Androconia present . . . *abdul*.
31. UnH with a prominent submarginal series of dark wedge-shaped spots.
- 32(35). UnF white markings as usual, the cell-end stripes not forming a Y with the discal band.

aratus group.

- 33(34). Both sexes bright sky blue. ♂ upF black border a thread, inwardly diffuse and increasing towards the apex; H without submarginal spots. Androconia sparse and rather narrow. ♀ upF with broad, deep black border which is inwardly diffuse in the costal half . . . *philatus*.
34. Both sexes pale chalky-blue. ♂ upF with black border uniform, inwardly diffuse and nearly 1 mm. wide; H with a double series of black submarginal spots. Androconia broad and numerous. ♀ up with comparatively narrow border on F, and inner black submarginal line on H highly zigzag . . . *aratus*.

cyta group.

35. UnF with cell-end stripes meeting the discal band to form a prominent Y. Up both sexes bright sky blue, ♂ with narrow bordering, ♀ with broad black border on F and prominent black, submarginal spots on H. Androconia very long and thickened at one end . . . *cyta*.

1. *Jamides bochus nabonassar* (Fruh.).

Papilio bochus Cramer, 1782, *Pap. Exot.*, 4 : 210, pl. cecxci, f. C ♂, D ♂ und.; Ceylon.
Lampides bochus nabonassar Fruhstorfer, 1915, *Arch. Naturgesch.*, 81 (A) (6) : 36; ♀ Borneo.
Jamides bochus var. Distant, 1884, *Rhop. Malay.* : 222, pl. xxi, f. 16 ♀, 19 ♂.
Jamides bochus nabonassar Seitz, 1923, *Grossschmett. Erde*, 9 : 902.

The broad black costal and distal bordering of the fore-wing separates this species from all other Malaysian *Jamides*. It is not common in Malaya, but occurs at all elevations and is taken at the flowers of such introduced leguminous plants as *Crotalaria anagyroides*.

Specimens from Malaya and Sumatra agree with Bornean *nabonassar*, the male of which has not been described.

♂. Differs from *bochus* ♂, from Ceylon and Burma, in the very broad black costal border on the fore-wing, the blue colour not extending above the median vein and vein 3, except for some very sparse blue dusting in the cell. (In Malayan males the blue colour extends into the lower part of the fore-wing cell.) The black submarginal spot in space 2 is larger and more prominent than in typical *bochus* ♂.

Underside as in *bochus* ♂ and *nabonassar* ♀.

Wing expanse 24.5 mm.

Neallotype. BRITISH NORTH BORNEO : Province Clarke, Bole, 4000 feet, 20.ii.1919 (G. F. C. Woollett). In British Museum.

Other races are *nila* Hsf. (West Java), figured in Piepers and Snellen, *Rhop. Java*, pl. xxi, f. 48 a ♂, b ♀, *nilana* Fruh. (East Java), *siraha* Kheil (Nias), and *enganicus* Fruh. (Engano).

2. *Jamides celeno aelianus* (F.).

Papilio celeno Cramer, 1775, *Pap. Exot.*, 1 : 51, pl. xxxi, f. C ♂, D ♂ und.; "Surinam."
Hesperia aelianus Fabricius, 1793, *Ent. Syst.*, 3 (i) : 280; ♂ India Occidentali.
Cupido agnata H. Druce, 1874, *Proc. zool. Soc. Lond.*, 1874 : 106, pl. xvi, f. 2 ♂, 4 ♂, 3 ♀; Siam.
Lampides aelianus Distant, 1884, *Rhop. Malay.* : 228, pl. xxi, f. 18 ♂.
Lampides optimus Distant (nec Röber), 1886, *tom. cit.* : 456, woodcut 127 ♀.
Lampides celeno agnata Seitz, 1923, *Grossschmett. Erde*, 9 : 904 (partim).

The female *J. celeno* resembles that sex of *J. pura* Mre. but the upperside presents a more dingy appearance : in *J. celeno*, the black bordering is paler and browner and the pale areas are of a more greyish hue. In *J. pura* female, the wings are a pale, but clear rich blue, and the bordering is deep black.

J. celeno is widely distributed in Malaya from the Langkawi Islands to Pulau Ubin, in the Straits of Johore, and although most abundant on the plains, it occurs at altitudes up to 3500 feet.

The species is common throughout Malaysia. The Malayan form agrees with Indian *aelianus* (F.), as does *agnata* Drc., from Siam : the more broadly bordered Sumatran race may be referred to *celeno* (Cr.), while *lawasa* (Moult.) (= *vyneri* (Moult.)) is the Bornean representative. The Javanese subspecies *ruvana* (Fruh.) (described from Lombok) is figured in Piepers and Snellen, pl. xx, f. 36 b, 37 a & b. Races from Paramalaya are *eyria* (Fruh.) (Engano), figured in Seitz, pl. 151 g 7 ♂, h 1 ♀, *arama* (Fruh.) (Nias), figured in Seitz, pl.

151 c 8 ♂, h 4 ♀, *carolina* (Tox.) (Pulau Weh), and *kinkura* (Feld.) from the Nicobars.

3. *Jamides pura pura* (Mre.).

Lampides pura Moore, 1886, *J. linn. Soc. (Zool.)*, 21 : 41; ♂♀ Mergui.

Lampides aelianus var. *a* Distant, 1884, *Rhop. Malay.* : 228, pl. xxii, f. 19 ♂.

Lampides celeno pura Seitz, *Grossschmett. Erde*, 9 : 904, pl. 151 g 5 ♂ und., 6 ♀.

J. pura is allied to *zebra* (H. H. Druce), but in addition to the difference mentioned in the key, the male of *zebra* has a longer fore-wing with more pointed apex. *J. zebra*, from Borneo, is figured in Seitz, pl. 151 c 3 ♂, and the Nias subspecies *vaneckei* (Fruh.) is shown on the same plate at h 2 ♂, 3 ♀; the species is represented from Sumatra in the British Museum.

The Philippine species *J. cleodus* (Feld.) is in facies similar to *J. pura*, but the male genitalia of the two are entirely different.

J. pura occurs from Burma, through Malaya and Sumatra, to Java and Borneo. Names ascertained to pertain to *J. pura* races are *parazebra* (Fruh.) (= *gennadia* (Fruh.)), figured in Piepers and Snellen, pl. xx, f. 35 ♂, 36 a ♂, *tenus* (Fruh.) (Borneo) and *zebrina* (Fruh.) (Nias), and *juliana* (van Eecke) which appears to be the representative from Simalur.

4. *Jamides malaccanus malaccanus* (Röb.).

(pl. 1, fig. 21, ♂, 20, ♀.)

Plebeius malaccanus Röber, 1886, *Deuts. ent. Z. "Iris,"* 1 : 57, pl. iv, f. 3 ♂; Perak.

Lampides suidas malaccana Seitz, 1923, *Grossschmett. Erde*, 9 : 906.

Hitherto this and the following species have been confused, but both *J. malaccanus* and *J. parasaturatus* are specifically distinct from *J. suidas* Feld. from the Philippines. The males of *J. malaccanus* and *J. parasaturatus* are separated easily; in the former the fore-wing black border is more or less uniform in width, while it increases markedly towards the apex in the latter. In both sexes, *J. malaccanus* is rather darker and the female has a purple tinge which is not apparent in the paler and clearer blue of *J. parasaturatus*: the differences in the females, however, are rather a matter of degree and the identification of some specimens is very difficult.

The female of *J. malaccanus* has not been described.

♀. Differs from *saturatus* ♀, from Java, in the rather broader black bordering of the fore-wing, and in that the distal half of the hind-wing is slightly dark dusted and the hind-wing submarginal spot in space 2 in not being inwardly orange crowned.

Underside as in the ♂ and in *saturatus* ♀.

Wing expanse 34.5 mm.

Neallotype. MALAY PENINSULA: Perak, vii.-viii.1895 (*Lakatt and Pamboo*). In British Museum, ex coll. Oberthür.

The species is common locally at altitudes up to 2000 feet.

The Sumatran race of *J. malaccanus* is *celinus* (Fruh.) (figured in Seitz, pl. 151 g 3 ♂, 4 ♀) and *saturatus* (Snell.) * (figured in Piepers and Snellen, pl. xx, f. 39) is the Javanese representative: we have seen no examples from Borneo. The reference to a hind-wing series of black, interneural, marginal lunules in the description of the male of *agnatinus* (Courv.) (East Java) proclaims it to be a *saturatus*.

* *Lycaena saturata* Snellen, 1892, *Tijd. Ent.*, 35 : 137.

5. *Jamides parasaturatus paramalaccanus* subsp. n.

(pl. 1, fig. 22, ♂, 19, ♀.)

Lampides suidas saturata f. *parasaturata* Fruhstorfer, 1915, *Arch. Naturgesch.*, **81** (A) (6) : 8;
 ♂ Java.
Lampides suidas saturata Seitz (nec Snellen), 1923, *Grossschmett. Erde*, **9** : 906.

♂. Upperside. Pale shining sky blue, with the underside markings visible, especially on the hind-wing. The fore-wing black distal border, which is inwardly very diffuse, is very narrow at the tornus, increasing to about 1 mm. at the apex. The hind-wing submarginal black spots found in *malaccanus* are usually obsolete but, when present, never extend above vein 2. Differs from *parasaturatus* ♂, from Java, in the paler blue colour and the marked apical broadening of the fore-wing border.

Underside. As in *parasaturatus*, the white strigae being narrower and rather straighter than in *malaccanus*, and the hind-wing orange tornal spot smaller.

Wing expanse 29 mm.

Holotype. MALAY PENINSULA : Selangor, Ampang Forest Reserve, 18.iv.1931 (A. S. Corbet). In British Museum.

♀. Paler and clearer blue than in *malaccanus* ♀, which it closely resembles, and lacking the purple tinge found in that species. The lower half of the fore-wing black distal border is usually less diffuse and the underside markings are hardly visible on the fore-wing above. Underside markings as in the male.

Wing expanse 30.5 mm.

Allotype. MALAY PENINSULA : Perak, vii.-viii.1895 (*Lakatt and Pamboo*). In British Museum, ex coll. Oberthür.

The species is uncommon in Malaya, on the plains and at altitudes up to 4000 feet, but appears to be widely distributed.

The female of the name-type from Java has not been described.

♀. Differs from *saturatus* ♀ in the greyer and more heavily dark dusted upperside, while the fore-wing black border is inwardly more diffuse.

Wing expanse 25 mm.

Neallotype. EAST JAVA : Lawang, 1897. In British Museum, ex coll. H. Fruhstorfer. Females from Sumatra are similar.

The species appears to be confined to the Malay Peninsula, Sumatra and Java, and the racial differentiation is rather slight.

The statements regarding the species in the English edition of Seitz, **9** : 906, are correct if "*parasaturata*" and "*saturata* Snell." are transposed in line 11, "beneath" altered to "above" in line 13, and "*parasurata*" emended to "*saturata*" in the following line.

6. *Jamides talinga* (Kheil).

(pl. 1, fig. 15, ♂, 14, ♀.)

Plebeius talinga Kheil, 1884, *Rhop. Nias* : 29, pl. v, f. 32 ♂, 33 ♀; Nias.

Lampides talinga de Nicéville, 1895, *J. Bombay nat. Hist. Soc.*, **10** : 39, pl. S, f. 27 ♂, 28 ♀.
Lampides kondulana talinga Seitz, 1923, *Grossschmett. Erde*, **9** : 906.

The male is pale shining blue above, with a remarkably uniform black distal border on the fore-wing, which increases to about 2 mm. at the apex : the hind-wing has a series of small black submarginal spots decreasing towards the apex. The female is liable to be confused with that sex of *pseudelpis*

(Btlr.), but is coloured a more uniform pale blue, the fore-wing distal border is blacker, more regular and does not widen so markedly at the apex, and there is little suggestion of dark dusting. The underside markings are narrow, but, perhaps, a shade broader than in *pseudelpis*.

The species occurs with little variation in Malaya, Sumatra and Nias, and is rare.

7. *Jamides caeruleus caeruleus* (Drc.).

Cupido caerulea H. Druce, 1873, *Proc. zool. Soc. Lond.*, 1873 : 349, pl. xxxii, f. 6 ♂ : Borneo.

Lampides kankena Distant (nec Felder), 1884, *Rhop. Malay.* : 229, pl. xx, f. 18 ♂, 11 ♀.

Lampides bochides de Nicéville, 1891, *J. Bombay nat. Hist. Soc.*, 6 : 367, pl. F, f. 15 ♂ ; South-east Borneo.

Lampides kankena bochides Seitz, 1923, *Grossschmett. Erde*, 9 : 907, pl. 151 a 4 ♂.

The shining, morpho-blue upperside of the male renders it unmistakable, while the female is deeper blue than any other Malayan *Jamides* (except *J. bochus*), although some specimens are not far removed from the female of the Malaysian race of *J. ferrari*.

The species is usually abundant where it occurs and found at all altitudes in Malaya. There is little differentiation between specimens from Malaya, Sumatra and Borneo; the Javanese representative has been separated as *metallica* (Fruh.) (figured in Piepers and Snellen, pl. xx, f. 44 ♂), while *selvagia* (Fruh.) is the subspecies from Simalur.

8. *Jamides elpis pseudelpis* (Btlr.).

Polyommatus elpis Godart, 1823, *Enc. Méth.*, 9 : 654; ♂ Java.

Lampides pseudelpis Butler, 1878, *Trans. linn. Soc. (Zool.)*, (2) 1 : 547, pl. lxxviii, f. 9 ♂, 8 ♀ ; Malacca.

Lampides elpis var. *pseudelpis* Distant, 1884, *Rhop. Malay.* : 227, pl. xx, f. 27 ♂, 28 ♀ (poor).

Lampides kondulana pseudelpis Seitz, 1923, *Grossschmett. Erde*, 9 : 906.

Toxopeus has shown (1930, *De Soort als Functie van Plaats en Tijd* : 134) that Godart's original description of *J. elpis* can apply only to the Javanese representative of *pseudelpis* (Btlr.). Horsfield first misidentified *J. elpis* as the Javanese race of *J. alecto* (Feld.), and this error has been perpetuated by subsequent authors. Godart's reference to a shining azure blue upperside and to narrow white stripes on the underside, coupled with the absence of any mention of a fore-wing dark distal border (to which attention is drawn in the description of *J. celeno* on the same page) or of a hind-wing submarginal series of black spots, leaves no doubt that he was dealing with the species now under discussion.

The male of *J. elpis* can hardly be mistaken for any other species except *J. limes* (Drc.) (figured in Seitz, pl. 151 a 8 ♂) from Borneo and known also from Java. The latter is larger, has a richer and deeper blue upperside and a remarkably large orange tornal spot on the hind-wing beneath.

The female of *J. elpis* is rather variable and may be confused with that sex of *J. alecto*. The female *pseudelpis* is rather pale blue, with a somewhat broad, brownish-black fore-wing distal border : on this border it is usually possible to trace the underside white submarginal lines. Both wings, particularly in the costal half of the hind-wing, are slightly dark dusted, giving the butterfly rather a dingy appearance. Both sexes of *pseudelpis* hardly differ above from *gera* (Fruh.), the Palawan race figured in Seitz, pl. 151 a 2 ♂, 3 ♀. The species is not common but occurs on the forested plains and foothills throughout Malaya. Other Malaysian subspecies are *virgulatus* (Drc.) (Borneo), *elpis* (Godt.) (= *piepersi* (Fruh.)) (West Java) figured in Piepers and Snellen, pl. xxi, f. 43 a ♂, b ♀, *sydra* (Fruh.) (East Java), and *baweana* (Fruh.) (Bawean).

The males of Sumatran *elpis* are paler and have a greener hue than the Malayan or Javanese forms.

9. *Jamides alecto ageladas* (Fruh.).

Lycaena alecto Felder, 1860, *SitzB. k. Akad. Wiss. Wien*, **40** : 456; Amboina. Figured in *Novara Reise Rhopal.*, pl. xxxiv, f. 23 ♂.
Lampides elpis ageladas Fruhstorfer, 1915, *Arch. Naturgesch.*, **81** (A) (6) : 19; ♂♀ North-east Sumatra. Figured in Seitz, pl. 151, f 7 ♂, g 1 ♀.
Lampides elpis rajatus Fruhstorfer, 1915, *loc. cit.* : 19 (*partim*).
Lampides elpis Distant (*nec* Godart), 1884, *Rhop. Malay.* : 226, pl. xxi, f. 25 ♂, 26 ♀.
Lampides elpis rajatus Seitz, 1923, *Grossschmett. Erde*, **9** : 908 (*partim*).

Fruhstorfer placed Malayan *J. alecto* under *rajatus*, but the type locality of the latter is central Tonkin, whence both sexes are darker and more heavily shaded than in Burmese, Malayan or Sumatran examples. The Malayan form is intermediate between *eurysaces* (Fruh.) (Assam) and Sumatran *ageladas*, although nearer to the latter. The species is variable and examples from the Langkawi Islands are somewhat darker and nearer to Burmese *eurysaces* : some mainland specimens are identical with Sumatran examples and it seems preferable to place the Malayan form under *ageladas*.

The underside markings of *J. alecto* are broader than those of *J. elpis*, and this distinction is particularly noticeable in the lower half of the fore-wing discal band. We have seen two Malayan females, however, with the usual broad bordering above but with narrow *elpis*-like stripes on the underside.

The species is not common in Malaya, but occurs at all altitudes in forested country.

The Javanese race is *horsfieldi* (Tox.) (figured in Piepers and Snellen, pl. xxi, f. 41 a ♂, b ♀). Paramalayan subspecies are *thanetus* (Fruh.) (Nias), figured in Seitz, pl. 151 e 5 & 6 ♂, *simalurana* (Tox.) (Simalur), *mentawica* (Hag.) (Mentawai Islands), and *elpidion* (Doh.) (Engano). Other important races are *kondulana* (Feld.) (Nicobars), with rather divergent male genitalia, *eurysaces* (Fruh.) (described from Assam and extending to Burma), figured in Seitz, pl. 151 e 7 ♂, f 1 ♀, and *ozea* (Fruh.) (Sikkim).

10. *Jamides ferrari evansi* subsp. n.

(pl. 1, fig. 11, ♂, 13, ♀.)

Jamides ferrari Evans, 1932, *Ident. Indian Butt.* : 238; ♂ Great Nicobar.

In the Malay Peninsula and Sumatra, occurs a species of *Jamides* allied to, but quite distinct from, *J. alecto* (Feld.). The facies and male genitalia indicate a close relationship with *J. ferrari* Evans (pl. 1, fig. 12), although, curiously enough, a British Museum male from the central Nicobar Islands is nearer to the Neomalayan representative than to nominotypical *ferrari*. In both sexes, the *J. ferrari* forms are distinctive in the elongated black submarginal spots on the upperside of the hind-wing.

♂. Upperside. Sky blue, with a purple tinge, and the underside markings scarcely visible. Differs from *ferrari* in the duller and broader black bordering on the fore-wing, and in the duller and less prominent black submarginal spots on the hind-wing. Differs from *ageladas* ♂, from Malaya, not only in the deeper colouring, but in the broader and more uniform fore-wing black distal border, which increases at the apex and is continued for some 3 or 4 mm. along the costal margin.

Underside. Pale grey-brown, with markings arranged as in *ageladas*, but the white stripes are much finer, more regular, and the interspaces are slightly, but definitely, darkened.

The hind-wing inner white submarginal line is strongly lunulated, and not composed of straight, contiguous white dashes as in *ageladas*. The underside markings differ from those of *ferrari* only in that the interspaces are not as heavily darkened, and the hind-wing tornal spot is not as large and prominent.

Wing expanse 35.5 mm.

Holotype. MALAY PENINSULA : Selangor, Bukit Kutu, 3300 feet, 29.ix.1932 (H. M. Pendlebury). In British Museum.

Two further Malayan males and a Sumatran male (Padang Sidempoean, xii.1902-i.1903), in the British Museum, show that some variation occurs in the width of the fore-wing distal border.

♀. Upperside. Pale sky blue, with the underside markings scarcely visible. The upperside resembles Malayan *caeruleus* ♀, but the colour is paler and lacks the purple tinge of that species. This border is narrower and more uniform than in *ageladas* ♀ and runs from nearly the middle of the costa to the tornus. The hind-wing black submarginal markings are narrower and finer than in *ageladas* and the inner submarginal line is much narrower and less prominent. On the other hand, the hind-wing submarginal spots are placed on a clear white ground in *evansi*, and not surrounded by pale bluish as in *caeruleus* ♀.

Underside. Colour and markings as in the male, and differing from *ageladas* in the same respects. Differs from *caeruleus* ♀ in the narrower white markings, and in the more lunulate white inner submarginal line and the less extensive orange tornal spot on the hind-wing. Usually, but not invariably, the white stripe in the centre of space 3 on the fore-wing is not separated but forms a continuation of the 3rd white line.

Wing expanse 35 mm.

Allotype. MALAY PENINSULA : Selangor, Bukit Kutu, 3300 feet, 2.ix.1932 (H. M. Pendlebury). In British Museum. In coll. Corbet two other females from Bukit Kutu and two females from Ginting Simpah (2080 feet) on the Selangor-Pahang border.

The new subspecies is named after Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O., to whom we are indebted for constructive criticism.

11. *Jamides cunilda nisanca* (Fruh.).

(pl. 1, fig. 16, ♀.)

Lycæna cunilda Snellen, 1896, *Tijd. Ent.*, **39** : 91, pl. i, f. 4 ♂; West Java. Figured in Piepers and Snellen, *Rhop. Java*, pl. xxi, f. 42 a ♂, b ♀.

Lampides cunilda nisanca Fruhstorfer, 1915, *Arch. Naturgesch.*, **81** (A) (6) : 14; ♂ Malay Peninsula.

Lampides sp. Distant, 1884, *Rhop. Malay.* : 230, pl. xxi, f. 24 ♂.

Lampides cunilda nisanca Seitz, 1923, *Grossschmett. Erde*, **9** : 907.

The deep, yet dull, purple-blue colour of the upperside separates the male *J. cunilda* from any other Malaysian *Jamides*. The female is distinctive also and can hardly be mistaken for any other species : the upperside is sky blue, appearing pale purple in a side light, and the underside markings are not visible by transparency.

The female of *nisanca* has not been described.

♀. Differs from Javanese *cunilda* ♀ in the rather deeper and more purple-blue upperside and in the paler and less contrasted submarginal markings on the hind-wing.

Wing expanse 28.5 mm.

Neallotype. MALAY PENINSULA : Perak, vii.-viii.1895 (*Lakatt and Pamboo*). In British Museum, ex coll. Oberthür.

The species is rare in Malaya and appears to be confined to the forested plains and foothills. The subspecies *nisanca* occurs from Burma to Sumatra and, apart from the nominotypical Javanese form, the only other race is the very dark *aditja* (Fruh.), from Borneo, figured in Seitz, pl. 151 a 5 ♂.

12. *Jamides abdul abdul* Dist.

Lampides abdul Distant, 1886, *Rhop. Malay.* : 456, pl. xliv, f. 22 ♀; Malacca.

Lampides marakata de Nicéville (Doherty MS.), 1890, *Butt. India, Burmah & Ceylon*, 3 : 174; ♂ Perak.

Lampides abdul abdul Seitz, 1923, *Grossschmett. Erde*, 9 : 908, pl. 151 b 1 ♂.

The male of this very rare species cannot be mistaken for any other : in the pale purple-blue female both wings are broadly black bordered (with the underside strigae showing through on the bordering) and, on the fore-wing, the whole of the area above the cell is blackened. The typical form flies in Malaya and Sumatra and the other subspecies are *daonides* (Röb.) (Java), figured in Piepers and Snellen, pl. xxi, f. 47 ♂, *daones* (H. H. Drc.) (Borneo), figured in Seitz, pl. 153 a 2 ♂, and *hamid* (Fruh.) (Nias).

Two other somewhat aberrant species of the *elpis* group are *J. lucide* (Nic.) (figured in Piepers and Snellen, pl. xxi, f. 46 ♀), and *J. lugine* (H. H. Drc.) (figured in Seitz, pl. 151 a 7 ♂). The former is confined to Sumatra (type locality) and Java, while the latter is known only from Borneo.

13. *Jamides philatus subditus* Mre.

Cupido philatus Snellen, 1878, *Tijd. Ent.*, 21 : 21, pl. i, f. 5 ♂; Celebes.

Lampides subdita Moore, 1886, *J. linn. Soc. (Zool.)*, 21 : 41; ♂♀ Mergui.

Lampides philatus subdita Seitz, 1923, *Grossschmett. Erde*, 9 : 910.

In Malaya, this rather rare species is taken singly in the forested plains and foothills. It shows considerable subspecific differentiation and the following names refer to Malaysian and Paramalayan races : *arius* (Fruh.) (Sumatra), *armatheus* (Fruh.) (Borneo), *athanetus* (Fruh.) (Java), figured in Piepers and Snellen, pl. xxi, f. 45 a ♂, b ♀, *arcaseius* (Fruh.) (Nias), and *telanjang* (Doh.) (Engano).

Toxopeus considered *J. coruscans* (Mre.), from Ceylon, to be conspecific with *J. philatus* (Snell.) but, in our opinion, the differences in the facies and male genitalia are too great to support this conclusion.

14. *Jamides aratus adana* Drc.

Papilio aratus Cramer, 1782, *Pap. Exot.*, 4 : 144, pl. cccxv, f. A ♂, B ♂ und.; Amboina.

Cupido adana H. Druce, 1873, *Proc. zool. Soc. Lond.*, 1873 : 349; ♂ Borneo.

Lampides aratus adana Seitz, 1923, *Grossschmett. Erde*, 9 : 909.

A male in coll. Corbet from Pulau Tioman (1931, *Malay collector*), constituting the first record of *J. aratus* in Malaya, is not separable from males of the Bornean race *adana*. Males from Sumatra and Borneo are identical, but females from the latter island are darker. The Tioman male differs from the nominotypical form in the broader bordering to both wings.

The subspecies *tryphiodorus* (Fruh.) (figured in Seitz, pl. 151 d 1 ♂, 2 ♀ and in Piepers and Snellen, pl. xx, f. 38 a ♂, b ♀) occurs in Java, and *nausiphanes* (Fruh.) is the Palawan race. Nominotypical *aratus* (Cr.), from Amboina, is figured in Seitz, pl. 151 d 3 ♂, 4 ♀.

15. *Jamides cyta minna* subsp. n.

(pl. 1, fig. 10, ♂.)

Catochrysops cyta Boisduval, 1832, *Voy. Astrolabe Lep.* : 87; ♂ New Ireland.

Toxopeus considered *cyta* (Bsdv.) to be the correct name for the species usually known as *amphissa* (Feld.). Boisduval's original description leaves little doubt that he was dealing with an *amphissa* and not an *elpis*-group form, and a New Ireland male in the British Museum accords with this description.

The species has been recorded from Burma (Toxopeus, 1930, *De Soort als Functie van Plaats en Tijd* : 22) and specimens recently obtained in the Malay Peninsula represent a new race.

♂. Upperside. Differs from the subspecies *lividus* (H. H. Drö.), from Borneo (figured in Seitz, pl. 153 a 1 ♂), and *margarita* (Mart.), from Sumatra, in the appreciable fore-wing and hind-wing black bordering, which increases to 1 mm. at the fore-wing apex. The hind-wing has a few black, elongated submarginal streaks in the tornal area.

Underside. Deeper greyish-brown and with more distinct white strigae than in the other Neomalayan races; otherwise very near to *margarita*.

Wing expanse 31 mm.

Holotype. MALAY PENINSULA : Perak, Maxwell's Hill, 3800 feet, 13.ix.1929 (A. S. Corbet). Type in coll. Corbet.

A second male from Pahang (Fraser's Hill, 4250 feet, 13.i.1929, A. S. Corbet) differs in the rather more restricted black bordering on the upperside.

♀. Upperside. Differs from *margarita* ♀ in the broader black fore-wing distal border. Underside as in the male.

Wing expanse 40 mm.

Allotype. MALAY PENINSULA : Penang. In Selangor Museum.

A Selangor Museum female from Perak (Larut Hills, 4500 feet, 21.ii.1932 (H. M. Pendlebury)) does not differ from the allotype.

This species admits of ready separation from all other Malaysian members of the *Jamides* group in the elongated fore-wing, and in the very prominent Y on the fore-wing beneath made by the cell-end stripes meeting the discal band. In Neomalayan forms, the submarginal spots on the hind-wing beneath are inwardly rounded and are only slightly darker brown than the ground colour.

Other forms which have been ascertained to be *J. cyta* races are *varclusia* (Fruh.) (Java), figured in Piepers and Snellen, pl. xxi, f. 40 a ♂, b ♀, *courvoisieri* (Fruh.) (Nias), *leiothrix* (Fruh.) (Engano), and *amphissa* (Feld. & Feld.) (Batchian), figured in *Novara Reise Lep.*, pl. xxxiv, f. 16 ♂, 17 ♂ und.

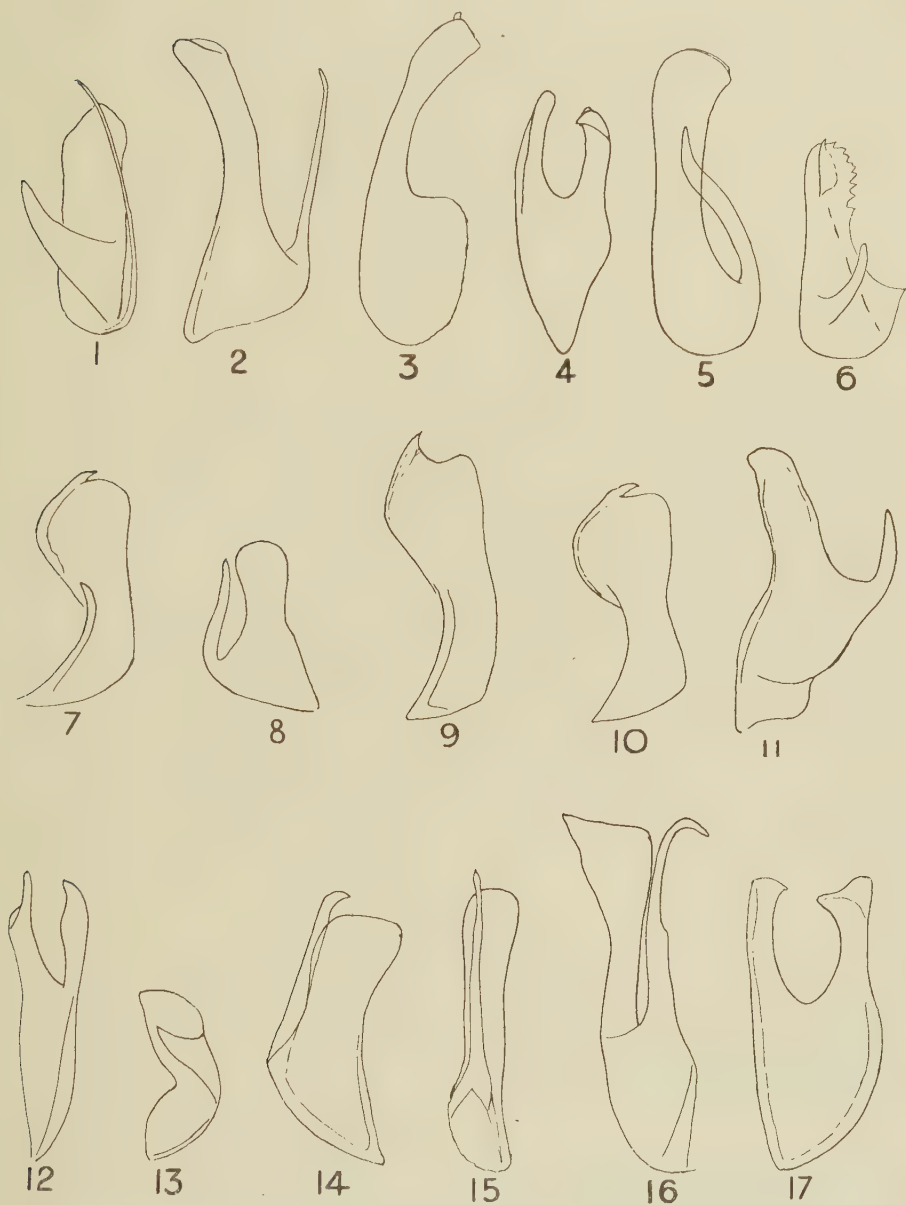
Toxopeus (1929, *Tijd. Ent.*, 72 : 230) proposed the name *Peplodyta*, with genotype *cyanea* Hbn. (= *cyanea* Cr., *cyaneus* F.), for *Pepliphorus* Hbn. ([1819], *Verz. bek. Schmett.*, (5) : 71). Hübner's genus included only *euchylas* Hbn. and *cyanea* Cr., and Scudder (1875, *Proc. Amer. Acad. Arts Sci. Boston*, 10 : 245) selected the latter species as genotype and his action was valid. There appears, therefore, to be no reason for the erection of *Peplodyta*, in which genus Toxopeus placed *cyta* also. In *cyanea*, the androconia are large and broad and in *euchylas* they are smaller, but both show affinity with the *Jamides* species and contrast strongly with the elongated, clavate androconia of *cyta*. A preliminary study of the venation of the species mentioned above suggests that the matter is somewhat involved and the question of the generic position of *cyta* must be left open.

During the course of this work the following types have been examined :

British Museum : *adana* Drc., *aditja* Fruh., *ageladas* Fruh., *agnata* Drc., *arama* Fruh., *arcaseius* Fruh., *arius* Fruh., *armatheus* Fruh., *athanetus* Fruh., *baueana* Fruh., *caerulea* Drc., *celinus* Fruh., *coruscans* Mre., *courvoisieri* Fruh., *eurysaces* Fruh., *eyria* Fruh., *ferrari* Evans, *gennadia* Fruh., *gerra* Fruh., *hamid* Fruh., *lawasa* Moul., *leiothrix* Fruh., *lividus* Drc., *lucine* Fruh., *metallica* Fruh., *nausiphanes* Fruh., *nila* Hsf., *nilana* Fruh., *ozea* Fruh., *parasaturata* Fruh., *parazebra* Fruh., *piepersi* Fruh., *pseudelpis* Btlr., *pura* Mre., *rajatus* Fruh., *ruvana* Fruh., *selvagia* Fruh., *subdita* Mre., *sydra* Fruh., *tenus* Fruh., *thanetus* Fruh., *tryphiodoros* Fruh., *vaneeckeii* Fruh., *vardusia* Fruh., *vyneri* Moul., *zebra* Drc. and *zebrina* Fruh.

Tring Zoological Museum : *alecto* Feld. & Feld., *amphissa* Feld. & Feld., *cleodrus* Feld. and *suidas* Feld.

We are indebted to the late Lord Rothschild, F.R.S., for permission to examine the Tring types, and to Mr. H. M. Pendlebury for the loan of specimens from the Selangor Museum.



FIGS. 1-17.—Male clasper of: (1) *Jamides coruscans* (Mre.) (Ceylon), (2) *J. philatus subditus* (Mre.) (Malaya), (3) *J. zebra* (Drc.) (Borneo), (4) *J. pura tenuis* (Fruh.) (Borneo), (5) *J. malaccanus saturatus* (Snell.) (Java), (6) *J. parasaturatus paramalaccanus* subsp. n. (Malaya), (7) *J. ferrari* Evans subsp. n. (Central Nicobars), (8) *J. talinga* (Kheil) (Sumatra), (9) *J. ferrari ferrari* Evans (Great Nicobar) type, (10) *J. ferrari evansi* subsp. n. (Malaya), (11) *J. alecto ageladas* (Fruh.) (Malaya), (12) *J. limes* (Drc.) (Borneo), (13) *J. cunilda nisanca* (Fruh.) (Malaya), (14) *J. elpis lacteatus* (Nic.) (Ceylon), (15) *J. elpis pseudelpis* (Btlr.) (Malaya), (16) *J. caeruleus caeruleus* (Drc.) (Malaya), (17) *J. celeno aelianus* (F.) (Malaya). All camera lucida drawings of the same magnification.

NEW *CELASTRINA* AND *TARAKA* FORMS FROM THE MALAY PENINSULA (LEPIDOPTERA: LYCAENIDAE)

By A. STEVEN CORBET, D.Sc., Ph.D.

WITH ONE PLATE AND SEVEN FIGURES.

(Read 2nd February, 1938.)

Celastrina Tutt.

Celastrina dohertyi dohertyi (Tytler).

(pl. 1, fig. 8, ♂.)

Cyaniris dohertyi Tytler, 1915, *J. Bombay nat. Hist. Soc.*, **24**: 121, pl. iv, f. 45 ♂, 46 ♂; Manipur.

With further specimens available for dissection, it has become necessary to modify some of the statements made regarding the *quadriplaga* group (Corbet, 1937, *Trans. R. ent. Soc. Lond.*, **86**: 21). The species *C. quadriplaga* (Snell.) is confined to Java, while *C. dohertyi* occurs in Burma and Malaya, with a subspecies *nearcha* Fruh. from Sumatra and Borneo.* In *C. quadriplaga* (Seitz, pl. 152 e 1 ♀) the hind-wing dark border is more or less regular, with the submarginal spots obsolete, and on the fore-wing beneath the discal spots are broad and coalescent in the male but less so in the female. The tornal half of the hind-wing is dark dusted in *C. dohertyi*, the submarginal spots are visible, while the discal spots on the underside of the fore-wing are slender, clearly defined and well separated. In the male *C. dohertyi* from Burma and Malaya the inner margin of the fore-wing is dark dusted, as are the veins on both wings. The female *C. dohertyi* from Malaya resembles the male *C. nearcha* from Sumatra (Seitz, pl. 152 d 8 ♂) in the lighter markings.

It has been found that the relative length of the fore-wing cell is not a satisfactory character whereby to separate members of the *C. quadriplaga* group from other *Celastrina* species.

Celastrina parvula sp. n.

(pl. 1, fig. 17.)

♂. Wing shape as in *C. musina* (Snell.), but hind-wing straighter between veins 2 and 6.

Upperside. Dull purple, but shining in a side light. Fore-wing black distal border inwardly diffuse, increasing slightly towards the apex where it is nearly 1 mm. broad: costa very narrowly black bordered. Hind-wing with a narrow black distal border and the costa black dusted to a depth of about 1 mm.: the veins dark dusted near the distal border and a dark submarginal spot in space 7.

Underside. Bluish-grey, shining slightly in a side light, with the fore-wing costal and distal borders faintly dusted with brownish. Both wings with narrow cell-end stripes. Fore-wing with very faint marginal interneural spots. The hind-wing fuscous, interneural submarginal spots extend from the tornus to space 7 and there appears to be a similar spot near the base of space 7. A very narrow fuscous line can be traced on the distal margins of both wings.

Androconia quadrate with a distinct tendency towards the wedge shape found in *C. musina*.

Wing expanse 19.5 mm.

* Sarawak, Mt. Dulit, 4000 feet, 22.x.1932 (B. M. Hobby and A. W. Moore, Oxford University Expedition), ♀. In British Museum.

Holotype. MALAY PENINSULA: Selangor, Bukit Kutu, 3300–3500 feet, 25.ix.1932 (H. M. Pendlebury). Unique. In British Museum.

This remarkable species, which forms a link between the *C. musina* and *C. singalensis* groups, differs from all other Malayan species in lacking discal spots on both wings.

The new species is far removed from *C. minima* (Evans) (pl. 1, fig. 18), with wing expanse 20–22 mm. This Burmese species is in the *C. puspa* group, has no male androconia, and is nearest to *C. moultoni* (Chapm.), from which it differs in the more rounded fore-wing termen, the paler underside, and the reddish-brown, instead of deep black, spots in the tornal half of the hind-wing beneath.

In the figure of the male clasper of *C. placidula irenae* Cbt. previously published (1937, *loc. cit.*: 20), the terminal hook has been bent upwards and is not clearly shown as in the figure of the Javanese race accompanying this paper.

Recently I have examined several specimens of *C. lavendularis isabella* Cbt. which differ from the normal form in the smaller size, one example having a wing expanse of only 22 mm.

Celastrina melaena melaena (Doh.).

Cyaniris melaena Doherty, 1889, *J. asiat. Soc. Bengal*, 58: 434, pl. xxiii, f. 13 ♂; Tenasserim Valley.

Two males from Selangor (Ampang, 10.ii.1937, *C. F. Cowan*) differ from the nominotypical form only in that the fore-wing black costal border is rather narrower. They are very similar to males of *C. pellecebra cyma* Tox. but differ in the following respects: smaller size (24–24.5 against 25–27 mm. wing expanse), deep violet-blue colour without the reddish-purple hue of *C. cyma*, the fore-wing has a black cell-end streak, the costa is more broadly black bordered and the distal black border is narrower, the violet-blue hind-wing has a clearly defined black border increasing towards the apex: the clear greyish-white underside lacks the reddish-brown dusting of *C. cyma*; the markings arranged as in *C. cyma* but narrower and more sharply defined.

Unlike *C. pellecebra*, *C. melaena* has no male androconia and the male genitalia are entirely different.

Taraka Doh.

Taraka hantu sp. n.

(pl. 1, fig. 9.)

♀. Upperside. Both wings white with brown borders, the fore-wing border being excavated in space 3. The fore-wing costal margin may be narrowly edged with brown (not in type). The basal quarter of the fore-wing is lightly brown dusted and there is a brown cell-end spot: only the extreme base of the hind-wing is lightly brown dusted.

In general appearance, the upperside resembles that of the Javanese *Taraka hamada nivata* Fruh. ♀ (Seitz, *Grossschmett. Erde*, 9, pl. 154, f. 10), but the bordering is broader and the discal areas are unmarked.

Underside. Both wings silvery-white with rather broad, irregular, pale brown submarginal fasciae. On the fore-wing, the costa bears three small, obscure, pale brown spots, the cell-end spot is almost obsolete, and there is a brown spot in the inner angle of space 1b. The fore-wing submarginal fascia comprises an irregular, wedge-shaped brown band extending broadly from the costal margin and narrowing to the tornus, where it terminates almost in a point, and, on the outer edge of this band, are single interneural, sagittate spots in each of the spaces 2, 3, 4 and 5: anteriorly placed to the wedge-shaped band is a short,

brown band extending from the inner margin to vein 3, and in space 3 is a small brown spot against the distal margin.

The hind-wing has a broad, inwardly irregular, very pale brown, submarginal band, which is deeply darkened in the subapical area, but almost fades out as it approaches the tornus: a few very indistinct brown marks are scattered in the discal and basal areas of the hind-wing.

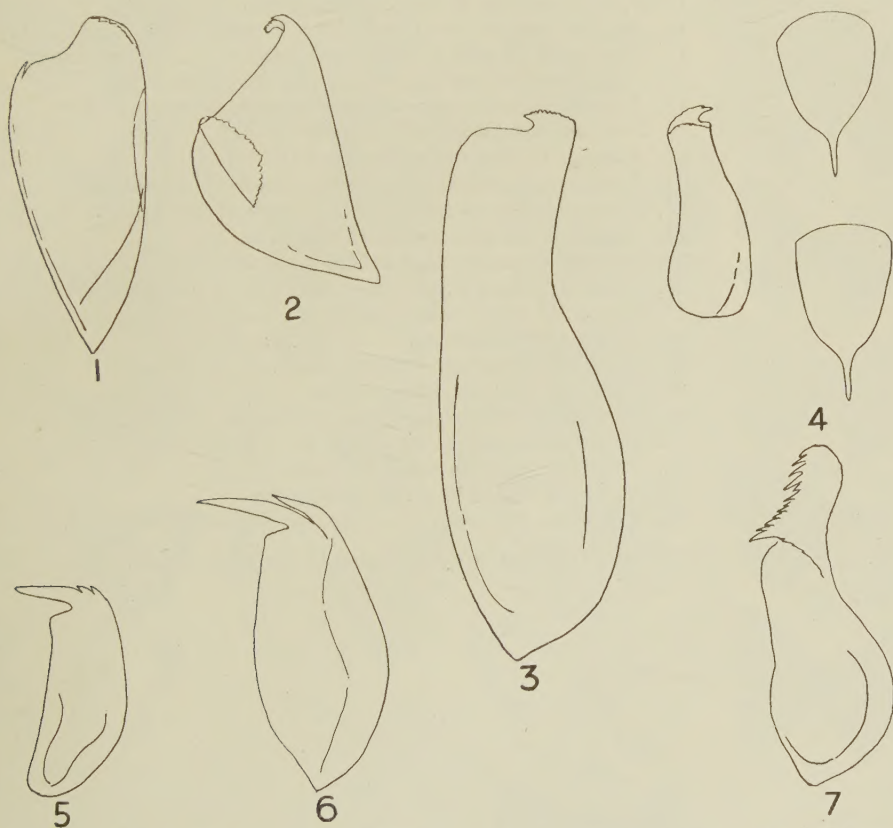
On both surfaces, cilia white with vein endings brown in the apical half of each wing.

Thorax and abdomen pale brown above, whitish below; legs almost white; antennae very pale brown above and beneath.

Wing expanse 26.5 mm.

Holotype. MALAY PENINSULA: Selangor, Bukit Kutu, 3540 feet, July 1929 (*H. M. Pendlebury*). In British Museum, ex coll. Brigadier W. H. Evans.

Two females in my collection taken in dense primary forest (Selangor, Ampang Forest Reserve, 21.iv.1929 and 26.v.1929, *A. S. Corbet*), with wing expanses of 23 and 16 mm. respectively, are similar in colour and markings. In flight, the butterfly has a very transparent appearance and flies in the same feeble and fluttering manner as *Pithecops*.



FIGS. 1-7.—Male claspers of (1) *Celastrina quadriplaga* (Snell.) (Java), (2) *C. dohertyi dohertyi* (Tytler) (Malaya), (3) *C. placidula snelleni* Tox. (Java), (4) *C. parvula* sp. n. (Malaya), with outlines of male androconia, (5) *C. minima* (Evans) (Burma, Dawngas), (6) *C. melaena* (Doh.) (Ataran), (7) *C. musina candaules* (Nic.) (Malaya). All camera lucida drawings of same magnification.

EXPLANATION OF PLATE 1.

- FIG. 1. *Nacaduba nelides* Nic., ♂.
 2. *Nacaduba datarica* (Snell.), ♂ (Java).
 3. *Nacaduba plumbata* Drc., ♂ (Solomon Islands).
 4. *Nacaduba calauria malayica* subsp. n., ♀.
 5. *Nacaduba nelides* Nic., ♀.
 6. *Nacaduba klanga* sp. n., ♀ holotype.
 7. *Nacaduba glauconia* (Snell.), ♂ (Java).
 8. *Celastrina dohertyi dohertyi* (Tytler), ♂.
 9. *Taraka hantu* sp. n., ♀ holotype.
 10. *Jamides cyta minna* subsp. n., ♂.
 11. *Jamides ferrari evansi* subsp. n., ♂ holotype.
 12. *Jamides ferrari* Evans, ♂ holotype (Great Nicobar).
 13. *Jamides ferrari evansi* subsp. n., ♀ allotype.
 14. *Jamides talinga* (Kheil), ♀.
 15. *Jamides talinga* (Kheil), ♂ (Sumatra).
 16. *Jamides cunilda nisanca* (Fruh.), ♀ neallotype.
 17. *Celastrina parvula* sp. n., ♂ holotype.
 18. *Celastrina minima* (Evans), ♂ (Burma, Dawnas).
 19. *Jamides parasaturatus paramalaccanus* subsp. n., ♀.
 20. *Jamides malaccanus malaccanus* (Röb.), ♀.
 21. *Jamides malaccanus malaccanus* (Röb.), ♂.
 22. *Jamides parasaturatus paramalaccanus* subsp. n., ♂.
 23. *Nacaduba hermus lysa* Fruh., ♀ allotype (Sumatra).
 24. *Nacaduba pavana singapura* subsp. n., ♀.
 25. *Nacaduba sanaya elioti* subsp. n., ♀ allotype.
 26. *Nacaduba asaga pendleburyi* subsp. n., ♀ allotype.
 27. *Nacaduba nabo swatipa* subsp. n., ♀ allotype.
 28. *Nacaduba intricata* sp. n., ♂ (Burma, Mergui).
 29. *Nacaduba asaga pendleburyi* subsp. n., ♂ holotype.
 30. *Nacaduba pavana singapura* subsp. n., ♂ holotype.
 31. *Nacaduba hermus lysa* Fruh., ♂ (Burma, Mergui).
 32. *Nacaduba sanaya elioti* subsp. n., ♂ holotype.
 33. *Nacaduba calauria malayica* subsp. n., ♂.
 34. *Nacaduba intricata* sp. n., ♀ allotype.
 35. *Nacaduba nabo swatipa* subsp. n., ♂ (Burma, Karens).

Unless stated otherwise, all are specimens of Malayan origin.



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Malayan Lycaenidæ.

